This is a digital copy of a book that was preserved for generations on library shelves before it was carefully scanned by Google as part of a project to make the world's books discoverable online.

It has survived long enough for the copyright to expire and the book to enter the public domain. A public domain book is one that was never subject to copyright or whose legal copyright term has expired. Whether a book is in the public domain may vary country to country. Public domain books are our gateways to the past, representing a wealth of history, culture and knowledge that's often difficult to discover.

Marks, notations and other marginalia present in the original volume will appear in this file - a reminder of this book's long journey from the publisher to a library and finally to you.

Usage guidelines

Google is proud to partner with libraries to digitize public domain materials and make them widely accessible. Public domain books belong to the public and we are merely their custodians. Nevertheless, this work is expensive, so in order to keep providing this resource, we have taken steps to prevent abuse by commercial parties, including placing technical restrictions on automated querying.

We also ask that you:

+ *Make non-commercial use of the files* We designed Google Book Search for use by individuals, and we request that you use these files for personal, non-commercial purposes.

+ *Refrain from automated querying* Do not send automated queries of any sort to Google's system: If you are conducting research on machine translation, optical character recognition or other areas where access to a large amount of text is helpful, please contact us. We encourage the use of public domain materials for these purposes and may be able to help.

+ *Maintain attribution* The Google "watermark" you see on each file is essential for informing people about this project and helping them find additional materials through Google Book Search. Please do not remove it.

+ *Keep it legal* Whatever your use, remember that you are responsible for ensuring that what you are doing is legal. Do not assume that just because we believe a book is in the public domain for users in the United States, that the work is also in the public domain for users in other countries. Whether a book is still in copyright varies from country to country, and we can't offer guidance on whether any specific use of any specific book is allowed. Please do not assume that a book's appearance in Google Book Search means it can be used in any manner anywhere in the world. Copyright infringement liability can be quite severe.

About Google Book Search

Google's mission is to organize the world's information and to make it universally accessible and useful. Google Book Search helps readers discover the world's books while helping authors and publishers reach new audiences. You can search through the full text of this book on the web at `http://books.google.com/`

IALS OF

DISEASES AND INSANI

JOHN C. SHAW, M

Get the Best **The New Standard**

DORLAND'S

AMERICAN ILLUSTRATED

MEDICAL DICTIONARY

LANE

MEDICAL LIBRARY

LEVI COOPER LANE FUND

is especially full in the **matter of tables**, containing more than a hundred of great practical value, including new tables of Tests, Stains and Staining Methods. A new feature is the inclusion of numerous **handsome illustrations**, many of them in colors, drawn and engraved specially for this book.

"I must acknowledge my astonishment at seeing how much he has condensed within relatively small space. I find nothing to criticise, very much to commend, and was interested in finding some of the new words which are not in other recent dictionaries."—ROSWELL PARK, *Professor of Principles and Practice of Surgery and Clinical Surgery, University of Buffalo.*

"Dr. Dorland's Dictionary is admirable. It is so well gotten up and of such convenient size. No errors have been found in my use of it."—HOWARD A. KELLY, *Professor of Gynecology, Johns Hopkins University, Baltimore.*

W. B. SAUNDERS & CO., 925 Walnut St., Philadelphia
New York: Fuller Building, 5th Ave. and 23d St.
London: 9, Henrietta Street, Covent Garden

Fourth Edition, Enlarged With Complete Vocabulary

THE
AMERICAN POCKET
MEDICAL DICTIONARY

EDITED BY

W. A. NEWMAN DORLAND, A. M., M. D.,

Assistant Obstetrician to the Hospital of the University of Pennsylvania.

FOURTH EDITION, REVISED and ENLARGED—JUST ISSUED.

Bound in Full Leather, Limp, with Gold Edges. Price, $1.00 net; with Patent Thumb Index, $1.25 net.

The book is an **absolutely new one.** It is not a revision of any old work, but it has been written entirely anew and is constructed on lines that experience has shown to be the most practical for a work of this kind. It aims to be **complete,** and to that end contains practically all the terms of modern medicine. This makes an unusually large vocabulary. Besides the ordinary dictionary terms the book contains a wealth of **anatomical and other tables.** This matter is of particular value to students for memorizing in preparation for examination.

"I am struck at once with admiration at the compact size and attractive exterior. I can recommend it to our students without reserve."—JAMES W. HOLLAND, M. D., *Dean of Jefferson Medical College*, Philadelphia.

"This is a handy pocket dictionary, which is so full and complete that it puts to shame some of the more pretentious volumes."—*Journal of the American Medical Association.*

"We have consulted it for the meaning of many new and rare terms, and have not met with a disappointment. The definitions are exquisitely clear and concise. We have never found so much information in so small a space."—*Dublin Journal of Medical Science.*

"This is a handy little volume that, upon examination, seems fairly to fulfil the promise of its title, and to contain a vast amount of information in a very small space. . . . It is somewhat surprising that it contains so many of the rarer terms used in medicine."—*Bulletin Johns Hopkins Hospital*, Baltimore.

W. B. SAUNDERS & CO., 925 Walnut St., Philadelphia.
New York: Fuller Building, 5th Ave. and 23d St.
London: 9, Henrietta Street, Covent Garden.

SINCE the issue of the first volume of the **Saunders Question-Compends,**

OVER 240,000 COPIES

of these unrivalled publications have been sold. This enormous sale is indisputable evidence of the value of these self-helps to students and physicians.

SAUNDERS' QUESTION-COMPENDS, No. 21

ESSENTIALS
OF
NERVOUS DISEASES AND INSANITY

THEIR
SYMPTOMS AND TREATMENT

BY

JOHN C. SHAW, M.D.

Late Clinical Professor of Diseases of the Mind and Nervous System,
Long Island College Hospital Medical School

FOURTH EDITION, THOROUGHLY REVISED

BY

SMITH ELY JELLIFFE, M.D., Ph.D.

Clinical Assistant, Columbia University, Department of Neurology
Visiting Neurologist, City Hospital, New York

ILLUSTRATED

LANE MEDICAL LIBRARY
16548
SAN FRANCISCO

PHILADELPHIA, NEW YORK, LONDON
W. B. SAUNDERS & COMPANY
1904

Set up, electrotyped, printed, and copyrighted October, 1891. Revised, reprinted, and recopyrighted November, 1893. Revised, reprinted, and recopyrighted August, 1897. Reprinted September, 1902. Revised, entirely reset, electrotyped, reprinted, and recopyrighted January, 1904.

Copyright, 1904, by W. B. Saunders & Company.

TROTYPED BY
& THOMSON, PHILA.

PRESS OF
W. B. SAUNDERS & COMPANY.

S53
1904

PREFACE TO THE FOURTH EDITION.

In no other field of medicine has general progress been more prominent than in the province that considers diseases of the nervous system and of the mind. Recognizing the many advances that have been made, the present edition of the essentials has been planned, and a thorough attempt has been made to bring the volume more in line with what is known, at the present day, of diseases of the nervous system.

The work has been entirely recast; the order of arrangement has been made to accord more with what is now thought, and the general grouping of subjects has been so set forth as to bring out the natural relations that exist between affiliated nervous disorders.

The limit in size of the book has precluded the complete discussion of a number of diseases that are represented very rarely in the general population; but, so far as possible, reference has been made to these rare conditions, and they have been placed in alliance with their kindred disorders.

Much diversity of opinion exists concerning diseases of the mind, but the general views held by leading alienists, such as Ziehen, Weygandt, Kraepelin, Berkeley, and Meyer, are here taken into serious consideration.

PREFACE.

THIS little book is not intended to take the place of the larger and more complete works, but to be used somewhat as a primer—for advanced students.

The limits of the book forbade the introduction of anatomical detail and physiological discussion. It is expected that the student will use, in conjunction with this volume, Edinger's Lectures on the Structure of the Central Nervous System, and the small monograph of Dr. Wm. Browning on the Vessels of the Brain.

The question of diagnosis has not been entered into fully, as it is believed that a knowledge of these diseases must precede a clear appreciation of their differential points.

A few diseases not frequently met with have been omitted. In the section on Insanity, the arrangement and descriptions have been made as simple as possible. Much more detail could have been given, and other phases of mental disorder described, but it is believed that too much amplification would have tended to confuse the student. If, with clinical teaching, a few outlines can be obtained, detail can be best and more readily added later.

There is appended to the end of the description of many of the diseases a Bibliography, or rather a list of references. Though this list has no pretension whatever to completeness, it may be of use to the student in looking up the subjects, if he so desires. Almost all the references are to the writings of American neurologists. These, it is believed, will be readily accessible to the student; and they so fully deal with the subjects as to make reference to foreign authors unnecessary. The works of Leyden, and of Charcot and his pupils, Kussmaul, Nothnagel, Westphal, can all be consulted, and are referred to in the description of the diseases.

I have to thank a number of medical friends for many kindnesses—the taking of photographs of cases for me, for which credit is given under the illustrations.

All the illustrations have been made by Mrs. J. C. Shaw from reproductions in pen and India ink from photographs or other illustrations.

CONTENTS.

SECTION I.

THE NEUROSES: FUNCTIONAL DISORDERS OF UNDETERMINED PATHOGENY.

PAGE

Chapter I.—Neurasthenia 17

Traumatic Neurasthenia, 21.

Chapter II.—Motor Neuroses 21

Occupation Neurasthenias—Myasthenias, 21—Writer's Cramp, 22—The Muscular Spasms or Tics, 22—Habit-spasms, 22—Spinal Accessory Spasm, 23—Unilateral Facial Spasm, 24—Torticollis, 24—Saltatory Spasm, 25—Facial Spasm, 25—Nodding Spasm, 25—Spasmodic Tic of Gilles de la Tourette, 25—Tetany, 25—Chorea, 26—Hereditary Chorea, 27—Paralysis Agitans, 28—Epilepsy, 30

Chapter III.—Vasomotor Neuroses 32

Headache, 33—Hemicrania, 34—Vasomotor Spasm and Paralysis, 36—Raynaud's Disease, 38—Exophthalmic Goiter, 40—Unilateral Facial Atrophy, 43.

SECTION II.

DISEASES OF THE PERIPHERAL NERVOUS SYSTEM.

Chapter I.—The Peripheral Sensory Neurons—Analgesias and Neuralgias 45

Neuralgias, 45—Coccygodynia, 45—Tarsalgia, 46—Morton's Tarsalgia, 46—Cervico-occipital Neuralgia, 46—Cervicobrachial Neuralgia, 46—Trifacial Neuralgia, 46—Herpes Zoster, 48.

PAGE

CHAPTER II.—DISEASES OF THE PERIPHERAL MOTOR OR MOTOR-SENSORY NEURONS 48

Injuries of Nerves, 48—Neuritis, 51—Multiple Neuritis, 52—Alcoholic Paralysis, 53—Diphtheric Neuritis, 54—Lead Neuritis, 55.

CHAPTER III.—PARALYSIS OF MUSCLES SUPPLIED BY THE PERIPHERAL MOTOR NEURONS 56

Paralysis of the Oculomotor, 56—Paralysis of the External Rectus or Sixth Nerve, 57—Peripheral Facial Paralysis, 57—Paralysis of the Median Nerve, 60—Paralysis of the Ulnar, 60—Paralysis of the Musculospiral Nerve, 61—Paralysis of the Circumflex Nerve, 62—Paralysis from Injury of the Brachial Plexus (Obstetric Paralysis; Duchenne-Erb Paralysis), 62—Paralysis of the Laryngeal Branches of the Vagus, 64—Paralysis of the Lumbar and Sacral Plexus, 66.

SECTION III.

DISEASES OF THE SPINAL CORD AND MEDULLA.

CHAPTER I.—INVOLVEMENT OF MOTOR NUCLEI—ANTERIOR POLIOMYELITIS 68

Infantile Spinal Paralysis, 68—Acute and Subacute Spinal Paralysis in the Adult, 71—Acute Ascending Paralysis, 72—Chronic Myelitis of the Anterior Horns of the Spinal Cord, 74—The Peroneal Form of Herbert Tooth, 77.

CHAPTER II.—DISEASE OF THE POSTERIOR COLUMNS . . . 78

Locomotor Ataxia, 78.

CHAPTER III.—DISEASES OF THE ANTEROLATERAL COLUMNS. 86

Lateral Sclerosis, 86—Little's Disease, 87.

CHAPTER IV.—LESION OF THE POSTEROLATERAL COLUMN—THE COMBINED SCLEROSES 88

Combined Scleroses, 88—Ataxic Paraplegia, 88—Friedreich's Disease, 89.

PAGE

CHAPTER V.—LESION OF THE ANTERIOR HORNS AND OF THE LATERAL TRACTS 92
Amyotrophic Lateral Sclerosis, 92.

CHAPTER VI.—LESIONS OF THE CENTRAL GRAY SUBSTANCE. 94
Syringomyelia, 94—Morvan's Disease, 98.

CHAPTER VII.—DIFFUSE DISEASES OF THE CORD 100
Myelitis, 100—Compression Myelitis, 102.

CHAPTER VIII.—LOCALIZATION OF LESIONS IN THE SPINAL CORD 104
Localization of the Function of the Segments of the Spinal Cord, 107, 108.

CHAPTER IX.—MULTIPLE DIFFUSE SCLEROSES 108

SECTION IV.

DISEASES OF THE MENINGES—SPINAL AND CEREBRAL.

Meningitis, 111—Acute Spinal Meningitis, 111—Acute Meningitis, 111—Purulent Meningitis, 112—Tuberculous Meningitis, 113.

SECTION V.

DISEASES OF THE BRAIN—THE CEREBRAL VESSELS AND OTHER NON-NERVOUS ELEMENTS.

CHAPTER I.—THE LOCALIZATION OF BRAIN DISEASES . . . 115
Convulsive Movements, 115—Paralysis, 116—Disturbances of Touch, 118—Disturbances of Vision, 118—Disturbances of Hearing. 120—Disturbances of Smell, 120—Disturbances of Taste, 120—Aphasia, 121.

CHAPTER II.—DISEASES OF THE BRAIN 127
Apoplexy, 127—Cerebral Hemorrhage, 127—Occlusion of Vessels, 129—Spastic Hemiplegia in Children, 130—Intracranial Tumors, 134—Abscess of the Brain, 136—Chronic Hydrocephalus (Internal), 138.

SECTION VI.

DISEASES OF TROPHIC ORIGIN USUALLY INCLUDED UNDER DISEASES OF THE NERVOUS SYSTEM.

Diseases of the Muscles, 139—Muscular Dystrophies 139—Pseudohypertrophic Paralysis, 139 – Erb's Juvenile Atrophy, 141—Acromegaly, 142—Myxedema, 144—Thomsen's Disease, 147.

SECTION VII.

DISEASES OF THE MIND—THE INSANITIES.

PAGE

CHAPTER I.—HYSTERIA 150

CHAPTER II.—IMPERATIVE CONCEPTIONS 155

CHAPTER III.—GENERAL NEUROPSYCHOSES 159
Epileptic Insanity, 159—Hysterical Insanity, 161.

CHAPTER IV.—INTOXICATION PSYCHOSES 162
Alcoholic Insanity, 162.

CHAPTER V.—DEGENERATIVE PSYCHOSES 164
Dementia Præcox, 165—General Paralysis of the Insane, 166—The Degenerative Insanities Without Intellectual Defect, 171—Paranoia, 172.

CHAPTER VI.—THE SIMPLE PSYCHOSES—MELANCHOLIA; MANIC—DEPRESSIVE INSANITY 176
Melancholia, 176—Manic—Depressive Insanity, 179—Periodic Mania, 181.

CHAPTER VII.—DEMENTIA 184
Senile Dementia, 184—Terminal Dementia, 185.

CHAPTER VIII.—DEFECTIVE MENTAL DEVELOPMENT . . . 186
Imbecility and Idiocy, 186.

x 191

ESSENTIALS
OF
NERVOUS DISEASES
AND INSANITY.

ESSENTIALS

OF

NERVOUS DISEASES AND INSANITY.

SECTION I.

THE NEUROSES: FUNCTIONAL DISORDERS OF UNDETERMINED PATHOGENY.

CHAPTER I.

NEURASTHENIA (Nerve Tire).

MANY individuals come into the world with tired nervous organizations. They are in a true sense of the word "born tired." They make up a large class of the inefficient and weak nervous men and women. The slightest exertion renders them incapable. If it so happens that they are possessed of sufficient money to live without labor, they become valetudinarians; otherwise many of them die.

Other individuals again have a fair amount of nervous capital; if not overdrawn, their bodies will respond to the strain; but if too much stress is laid upon the nervous system, it becomes tired and neurasthenia results.

The members of a third class are endowed with great nervous force. They make the great workers of the world; but even they, in the excess of their endeavors, tire their nervous system to the point of exhaustion and may develop neurasthenia. Of the numerous gradations, the limited space does not permit of discussion. It is only with average types that this section will deal.

Etiology.—A predisposition to it may be inherited or be acquired. The nervous, highly active, restless temperament is most subject to it. It usually occurs at a time of life when the anxieties and work inseparable from our mode of existence are in full operation. It is brought on frequently in men by too prolonged and anxious work and excesses of all kinds which lower the vitality; in women, by cares and petty annoyances, with an enervating mode of life, too rapid pregnancies, the drain from lactation, profuse discharges of blood. Exhausting diseases of all kinds may bring it on.

Symptoms.—It exhibits the most marked variation in its symptoms, and yet there is a similarity about them which makes the disease distinct and easily recognizable, at least in its typical manifestations. A number of divisions have been made, such as cerebral, spinal, and sexual neurasthenia; but these are purely arbitrary, and simply have for their basis a preponderance of symptoms referable to the brain, spine, or sexual apparatus, etc.; but, after all, the condition is general. The symptoms most commonly met with are inability for exertion; the person is easily tired, has no ability to do mental work; he is confused, gets headache on the least effort, has vague pains about the head, and neuralgic pains about the body, with sensations of prickling and numbness. The head and neck tire easily and ache; tender painful spots may be felt at one or more points along the spine; sleeplessness is common. The sufferers are apprehensive and unnecessarily anxious: dread they will have some serious disease. On the least exertion they have palpitation; perspiration breaks out on them, and they have flushing of the face; there may be heart fluttering which occurs at night and wakes them, causing them great distress and anxiety. They dislike to make mental and physical effort. Dyspepsia often comes on, either as a complication or was the original difficulty. When they take food, they are distressed and uncomfortable; the head symptoms are made worse. They are confused and dizzy; syncope may occur; they gradually leave out of their diet first one and then another article, until they reach the starvation point, making their condition worse rather than better.

Their attention becomes concentrated upon themselves and their organs. Many of them become hypochondriacal, often about their sexual apparatus, and they consult one physician after another. A feeling of constriction about the head, with discomfort and pain on the top of the head, is very common. These persons are usually pale and anemic, with appetite poor, bowels constipated, spirits depressed, and facial expression often anxious. They avoid strangers, and may develop morbid fears of all kinds. They remain in the house on the plea that going out makes them uncomfortable, increases the pains in the back and head—tires them; or they dread that something will happen to them—that they will faint or have an attack of paralysis, etc.

The grave forms of neurasthenia which depend upon heredity, instability, and excessive irritability of the nervous system may be manifested early in life—in fact, sometimes in very young children. In this condition we are on the border-lines of some of the psychoses, which appear often to be dove-tailed in with each other, such as imperative conceptions, hysteria, and some of the milder psychoses. We may also find them mixed with the not fully developed paranoias. This inherited unstable state of the nervous system depends evidently upon some defect in the power of the neurons to assimilate and store up nutrition and force in sufficient quantity and with sufficient rapidity to carry on fully and easily the work of life.

These nervous systems are too easily influenced and disturbed by peripheral irritations, by external conditions, and by the presence of any slight abnormal products in the blood-supply. There is not a proper harmony between the operations of the various parts of the central nervous apparatus. The inhibitory centers are defective and weak. The entire organism often appears weak, or rather excessively irritable, and its nerve-supply is oversensitive. The ordinary conditions of life, the atmospheric conditions, the food usually eaten, give rise to irritation, and through the digestive apparatus affect unduly the nervous system. These trivial disorders in the viscera give rise to many of the aches and pains about the body, such as those in the back, etc.

The functions of the sexual apparatus also produce unusual sensory disorders and mental anxieties. Here we must place the cases of so-called sexual neurasthenia. The individuals, especially young men, who, with other neurasthenic symptoms which must sometimes be sought for, complain of emissions of semen at night, or believe themselves the subjects of losses of semen in the urine, attribute all their ill-feelings to this supposed cause; and here we usually find the influence of suggestion through the reading of advertisements, etc. The mental state of most of these cases of neurasthenia is, like the other nervous manifestations, unstable—in some directions weak. The patients are the subjects of anxieties and fears as to their physical and mental state, and are easily affected by suggestions, made in the way of remarks or statements, about the illnesses of other persons. What they read in the newspapers in reference to diseases, murders, suicides, etc., makes a profound impression on them and throws them into a state of anxiety and apprehension. They at once believe themselves the subjects of this or that disease or condition they have heard or read about. This mental worry adds a group of symptoms the result of fear. Strange to say, they often seek out in the newspapers, or are anxious to discuss with their acquaintances, the subjects of which they have so much dread and anxiety. Their thoughts are always on themselves and their condition, which they look upon with great anxiety and hopelessness. They are easily disturbed by a word inadvertently spoken by a physician. There are often palpitations, sensations of suffocation, oppression, and a feeling of internal tremor.

Prognosis.—The majority of these invalids recover under suitable treatment.

Treatment.—Remove the causes which have operated to bring about the condition; avoid overwork and, above all, anxiety, if that be possible; stop any drains which are being made on the system, such as hemorrhages, lactation, etc. A good ample supply of food is most important, with fat of some kind in the winter; cod-liver oil or cream can be used. Medicinally, tincture of nux vomica may be taken before meals, with pepsin after meals, and if there is much gas formed in the stomach and intestines, charcoal may be added. The bowels should be kept regular with cascara sagrada, or the small granules of aloin, belladonna, and strychnin can be given at night. If there is much anemia, later, quinin and iron or arsenic can be given. The person should live out-of-doors, if the weather admits, and if possible remove to some new locality, temporarily, with cheerful surroundings. He should be encouraged to take moderate exercise at first, gradually increasing it, but never to excess. Cold sponging in the morning is of service in a large number of cases. Stimulants should be avoided. This line of treatment should be continued for a long time. The mental condition of these persons should always be kept in mind in their treatment. Much can be done by convincing them of the groundlessness of some of their fears and aiding them by encouragement. During the summer months these patients should live out-of-doors, preferably in a mountainous region.

TRAUMATIC NEURASTHENIA.

This is a type of neurasthenia that is occasioned by severe shock. It differs little from the ordinary types save in the acuteness of its onset and in the etiologic factor. It rarely occurs in those of sound nervous organizations, and when the factor of litigation and damage suits complicates, the picture becomes very frequently that of a mild insanity.

Many of these patients recover at the close of a suit, whether they win or not.

Bibliography.—Beard, Nervous Exhaustion. Bailey, Accident and Injury. Saville, Neurasthenia. The recent literature is very exhaustive.

CHAPTER II.

MOTOR NEUROSES.

OCCUPATION NEURASTHENIAS–MYASTHENIAS.

THE general muscular weakness which is so pronounced in neurasthenia in general by reason of special work thrown upon one muscle or group of muscles may develop in that muscle or group of muscles a markedly paretic condition, particularly for a certain movement coördination. This may or may not be associated with cramps in the muscle. A large variety of these myasthenias have been described. Some of these muscle tires lead to muscle atrophy.

It may be that the pathogeny of these affections is purely muscular, but as most cases occur in neuropathic individuals, there is strong reason to believe that the nervous system is primarily involved.

Writer's Cramp.—Writer's cramp is one of this group, occurring in persons of a highly nervous temperament and of neuropathic inheritance, and developed by special occupations. It is a spasm in the muscles associated in the performance of some work requiring delicacy and more or less long-continued or severe action of those muscles, such as is required in writing, pianoforte playing, sewing, telegraphing, etc. In some of the cases as soon as the person attempts to use the hand the muscles are seized with tonic or clonic spasms, so that the intended act cannot be performed. In others the attempt to use the hand brings on a tremulous condition, and if writing be the act attempted, it is uneven, coarse, and imperfect. In others, and perhaps the most common manifestation of the difficulty, the person experiences great fatigue, weakness, and aching in the hand and forearm, at times even in the shoulder; if the work or the pen be laid aside, the feeling may disappear. In such persons, if they attempt to write with the left hand, sooner or later it is affected in the same way as the right.

Other occupation myasthenias are telegrapher's cramp, musician's cramp, tailor's spasm, milker's cramp, cigar-roller's and ballet-dancer's cramp. Typewriters, dentists, golfers, billiard players, painters, and many others develop similar conditions.

Rest, tonics, and change of occupation constitute the only treatment.

THE MUSCULAR SPASMS OR TICS.

Spasmodic involuntary movements are very common and are found in all degrees from a simple habit-spasm to grave general choreic movements.

Habit-spasms.—These are often found in children and may be the remains of a chorea or they may be a continuance of an habitual movement made by the child—at first in play and later become uncontrollable. Meige and Feindel,[1] in an

---

a consideration of tics see Henry Meige and E. Feindel, t *leur Traitement*, Masson and Cie, Paris, 1902.

important monograph on "Tics," maintain that most of the tic movements, even the most complicated, have a like origin.

A study of the cases and reference to the diagram of the nerves and their distribution to the muscles will be a guide. The commonly met with spasmodic conditions are as follows:

Spinal Accessory Spasm.—It may be tonic or clonic. It is usually observed in persons of a strong neuropathic tendency—those whose families are the subjects of hysteria, insanity, and other nervous disorders.

The immediate cause and the exact location of the irritation which gives rise to these spasms are unknown, but it seems more than probable that they have their origin in the cortex. If the spasm affects the sternocleidomastoid, the head is drawn backward and to one side, the chin turned upward and to one side, and raised. If the trapezius is affected, the head is drawn backward and toward the affected side without rotation of the chin; the shoulder is raised. It is rarely confined to the muscles supplied by the spinal accessory; the splenius is often affected; lateral curvature of the spine may be observed in some of the chronic cases. It usually begins with uneasiness in the neck. Soon the head begins to be turned slowly to one side; as soon as the spasm relaxes, the head returns to the normal attitude. The spasm is repeated again in a short time with the same relaxation. The frequency with which this recurs varies. As the condition becomes more chronic the head may remain permanently in that position. At first, by an effort of the will or the hand, the head can be brought to the normal position, but it at once, upon being released, returns to the abnormal attitude.

Prognosis is not favorable in these cases. Some of them recover, but very few, and there is a great tendency for them to relapse.

Treatment is most unsatisfactory: of medicines, hypodermic injections of atropin in gradually increasing doses, beginning with $\frac{1}{200}$ or $\frac{1}{300}$ of a grain twice a day, gives the best results, but it is not always successful. The nerve and the muscles have been divided, but no permanent good results have been obtained. Section of the supplying nerve controls the muscles of a certain group, but other groups later frequently become implicated.

Unilateral Facial Spasm.—Symptoms.—Clonic spasm in the distribution of the facial nerve: the muscles about the eye are more constantly the seat of the spasm, even when all the muscles take part paroxysmally in this spasm. Some cases are so severe that for the time being the eye is entirely closed, and the mouth drawn far to one side; the alæ of the nose also drawn up. It may last for years, but there are times when the paroxysms are much more frequent and severe than at others.

Treatment.—There is no treatment which gives the slightest relief in these cases, and this after the most careful trial of all kinds of medicaments and electricity. Psychic modes of treatment offer the most hope.

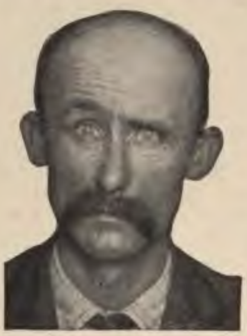

FIG. 1.—Facial palsy of left side. Bilateral attempt to raise eyebrows (Church).

Torticollis (Wry-neck).—This consists of a clonic or tonic spasm of the muscles supplied by the spinal accessory. At least four general types are noted: (1) Congenital; (2) symptomatic; (3) false; (4) spasmodic. Women are affected more often than men.

The symptoms consist of feelings of slight discomfort or pain in the neck, followed by the acute, sudden, sharp contraction of the sternocleidomastoid and portions of the trapezius. The chin is thrown upward, the head rotated to the opposite side, and inclined toward the affected side. The condition may last for a few moments only and then the muscles relax, or the convulsion may become tonic and the position a permanent one, with atrophy of the opposing muscles and hypertrophy of those muscle-fibers which are contracted. The treatment is very difficult and unsatisfactory. (See Fig. 2.)

Saltatory spasm, as in the "jumpers," is an allied affection with a hysteric basis. The dancing mania is the outcome of this form of tic.

Facial spasm (mimic tic) is usually unilateral and consists of sudden contractions of the muscles of the face. These patients often make very peculiar grimaces.

Nodding spasm is another type in which rhythmic nodding or oscillatory movements of the head may occur. It occurs in badly nourished children and is closely allied to chorea.

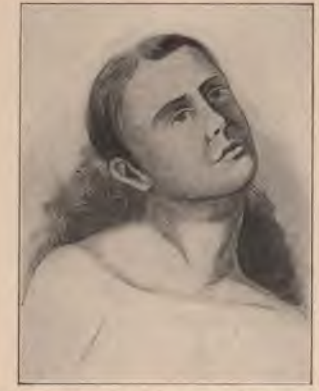

FIG. 2.—Showing position of neck in torticollis.

Spasmodic Tic of Gilles de la Tourette.—This is a spasmodic condition affecting the upper extremities, associated with coprolalia, grimaces, and contortions.

Tetany is the name given to a form of spasmodic muscular movements often seen in children and by many mistaken for epilepsy. During an attack the hands are often strongly flexed, the arms and elbows are drawn up, while the legs are extended almost in talipes. These movements are probably the result of some form of toxemia or of a gastro-intestinal irritation. They have been found following pneumonia and also accompanying affections of the thyroid.

Not only are the voluntary muscles of the body subject to these spasmodic convulsive disorders, but gastric, vesical, respiratory, rectal, and other *tics* or *convulsions* or *fits* may be recognized.

CHOREA.

Etiology.—Heredity plays an important part in its production; it affects chiefly children—girls more frequently than boys; it may be due to anything which tends to lower the general vitality. There appears to exist a relationship between chorea and rheumatism. Fright, anxiety, overstrain at school, with confinement, are exciting causes in those predisposed. Toxic states can now be included in the list of causes. Chorea frequently follows infections, and there is good reason to believe that some choreas are due to specific infectious agents.

Symptoms.—The child becomes listless and inattentive, and neglects its school work; the intellect is dulled. Irregular muscular twitchings in the face or in one arm, or in one arm and in one leg, soon begin to develop. Occasionally there is paresis of one side as the first symptom; the muscular twitchings cause constant facial distortions; the arm is jerked from side to side in paroxysms; the child holds the affected hand with the sound one to prevent these movements. The choreic twitchings may be general, and it is almost impossible for the child to use its limbs; it stumbles and falls in any direction. Cases may be seen in which all extremities, head, eyes, and muscles of the throat are affected; it is almost impossible for these children to speak or to swallow.

While these muscles are twitching at intervals, throwing the parts into undesired positions, they are paretic; the arms and legs cannot be moved voluntarily, and the head drops in any direction if unsupported. Besides the pains in the limbs which some children complain of, there are no sensory symptoms. The little sufferers are always irritable, depressed, emotional, and mentally inactive; if kept at school, they cannot learn and take no interest in their studies. There is an endocardial murmur in some cases; the pulse may be irregular and weak. There may be several attacks, with intervals of a few months or years.

Pathologic Anatomy.—There are no distinctive lesions in chorea. Dana has attempted to sum up what is known of the changes.[1] These consist of subcortical and basal hyperemia, paralyzed, dilated, and badly nourished arteries, exudations in the lymph-spaces, and similar changes which are evidently secondary.

Prognosis and Duration.—The prognosis is favorable in almost all these cases, especially the acute; the duration under treatment is usually from four to eight weeks.

Treatment.—This should consist in removal of any cause which can be discovered. The bowels and digestion should be regulated; ample light nutritious diet, with cold sponging night and morning; abundance of fresh air; avoidance of close rooms: the bedrooms should be well ventilated, especially at night, keeping the children out-of-doors as much as possible. Absolute rest in bed has been advised, and may be suitable for those cases where there are excessively disordered movements or paresis associated with them. In other cases the children should be kept out-of-doors, and they should be encouraged to play about. If there is much pain or a slightly elevated temperature, a few doses of antipyrin may be given, provided there is no serious heart lesion. If the child is in very poor physical condition, cod-liver oil may be given. For the medicinal treatment, Fowler's solution gives the best results. Pyrophosphate of iron is also useful. Belladonna preparations are excellent adjuvants.

Hereditary Chorea.—This is a condition which was first mentioned by Dr. Waters, of Franklin, N. Y., in a letter to Dunglison in 1842. It was a form of chorea found in certain families in his neighborhood; it was hereditary; rarely appeared before adult life; was incurable; and dementia always followed. Twenty years later Lyon wrote about it;[2] he gave three histories in which five and three generations were affected.

In 1872 Huntingdon described it in a few cases on Long Island. He says that it affects males more frequently than females, and comes on gradually, always after middle life, and is incurable; it always ends in insanity, and there is a tendency to suicide. In most of the cases the disease is hereditary and affects a great many members of a family, and for several generations; it affects both sexes, and begins usually after twenty-five years of age; it may be transmitted through the paternal or maternal side. It does not develop from ordinary chorea, and begins without apparent cause by a twitching of the face, then the arms are affected, and later the legs, or it may begin as a general twitching. The movements may be violent and coarse in character; in the leg it produces a peculiar gait: there is sudden stopping; the persons look as if they were going to fall forward; the body sways; at last they are able to take a few rapid steps, and so recover their balance. In most cases the movements cease in sleep. There is no wasting of the muscles; no anesthesia; the deep reflexes are normal or somewhat increased; the electric reactions are normal. There is no heart disease; rheumatism is not associated with it, as in ordinary chorea. The bodily functions are normal. It is very commonly followed by some mental disorder. The choreic insanity begins with loss of memory and childishness, gradually passing into dementia.

---

[1] *Brain*, 1890.

[2] *American Medical* Times, 1863.

Pathologic Anatomy.—Several autopsies made in the past few years have shown meningitis and pachymeningitis, atrophy of the convolutions, thickening of the blood-vessels, and atheromatous changes.

PARALYSIS AGITANS.

This is a disease of advanced life; men are most frequently affected by it. It is evidently connected with degenerations of advancing years.

Symptoms.—It may begin slowly or somewhat suddenly; there may be some pains in the extremities, insomnia, and irritability, but these are frequently absent. The disease usually begins as a trembling in the muscles of one hand: at first it may be intermittent, but later it is constant, except when asleep. The tremor is a slow, rhythmic movement; the attitude of the hand is peculiar: the wrist is slightly flexed; the fingers bent downward; the thumb lightly opposed to the index and middle finger. The tremor may for a long time be confined to one arm or extend to the leg of the same side; it is never so marked in the lower extremity as in the upper; the head may also be involved, and the tremor may even begin in the head. The speech is often slow, and, as the disease progresses, muscular rigidity occurs to a certain extent, especially in the muscles of the back, so that the spine is more or less fixed; this gives rise to a peculiar, bent-forward attitude; the head is inclined on the chest; in speaking, the person turns the eyes up. The gait is characteristic: the person rises very slowly and with some difficulty from his seat. It is found that some persons show a tendency to run forward, and Charcot found that pulling on the back of the dress of one of his patients caused a tendency to retropulsion. There are at times uncomfortable sensations about the body, but one which is almost constant is a sensation of heat and burning; the person sleeps with very little covering. As the disease progresses the health fails, the mind grows weaker, bedsores may form, and death is caused by some intercurrent disease. Death may occur from pneumonia, pleuritis, etc. There are occasionally observed cases of this disease without the trembling. (See Figs. 3, 4.)

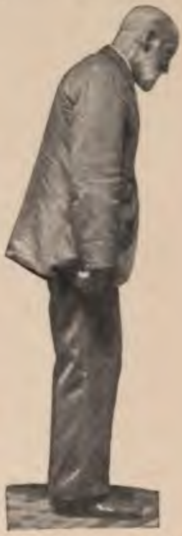

FIG. 3.—Parkinson's disease (attitude) (Church).

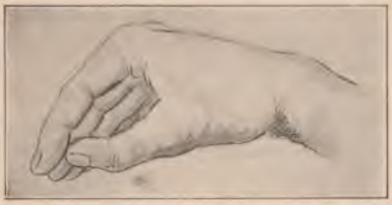

FIG. 4.—Showing "pill-rolling" position of hand in paralysis agitans (after Charcot).

Pathologic Anatomy.—Nothing definite is known of the changes which give rise to these symptoms.

Prognosis.—It is a slowly progressive disease.

Treatment.—This is only palliative: attention to the general health; light nutritious diet. Tonics may be given; a host of remedies have been given, but they are all useless. Morphin may give some relief to the burning. Small doses of hyoscin hydrobromate, $\frac{1}{200}$ grain two or three times a day, diminish the tremor and give relief. There should be freedom from work and anxiety. If there is insomnia, sodium bromid, urethan, sulphonal, etc., may be used at intervals.

EPILEPSY.

Etiology.—A neuropathic family history is to be traced in almost all the cases; rarely there is direct transmission. It occurs most frequently for the first time among young persons, and is most common between ten and twenty years of age. As exciting causes, intense emotional excitement, fright, irritations (peripheral) of all kinds, from the intestinal tract, etc.; febrile diseases, injuries to the head, and falls are frequent exciting causes in these predisposed children. Brain injuries at birth are responsible for a large number of epileptics.

Symptoms.—Frequently the first attack occurs without warning; the child falls and is convulsed. In a proportion of the cases there is a premonitory symptom called an aura, or "signal symptom" of Seguin. This may be a localized spasm occurring in the hand, or even in a finger, or on the side of the face, and extending to other parts (this is the type of Jacksonian epilepsy), followed by general convulsion.

It is sometimes a question whether an aura is motor or sensory, as in some cases it may be due to a very slight spasmodic wave which is not perceptible even in the extremities, but especially in those auræ from the viscera, or if they be purely sensory, as usually described by the patient. The sensory aura is the most common perhaps; it is a feeling of tingling or numbness in the parts, which extends up to the head. They sometimes speak of it as "something running up the leg" or arm or from the epigastrium. At any rate it is a peculiar, indescribable sensation which these persons experience, apparently starting at some point in the body and radiating toward the cephalic extremity—apparently, because it is really due to central irritation, and what is felt is really a "referred sensation."

The auræ may be visual, when the person sees flashes of light, color, or even distinct objects, such as persons, animals, or even scenes; or they may be auditory, when he hears noises, voices, music, or singing; or olfactory, when he smells odors, which are disagreeable usually, such as of sulphur, decaying animal matter, etc., or they may be pleasant. There are also psychic auræ: the person experiences a feeling of fright and dread or he is in a confused, dreamy state.

The attacks are of two kinds—*petit mal* and *grand mal;* both of these forms of attack may occur in the same person. The attacks of petit mal are characterized by sudden loss of consciousness, temporary in duration; the person stops in any act which he is performing, and stares fixedly before him. He may remain perfectly quiet, and as soon as the attack ceases, resumes the acts he was performing before it; or he may jump up and hurriedly move about, opening a door or pulling up a curtain, etc., or start to undress, or running ahead a distance (precursive epilepsy). There usually is a slight tonic spasm of the entire body in these attacks, but no clonic convulsion. Loss of consciousness is not an absolutely necessary factor.

The attacks of haut mal or grand mal are ushered in by pallor, by dilated pupils, often by a loud, piercing scream, simultaneous with loss of consciousness, falling to the floor, tonic convulsions. The face now becomes livid; clonic convulsions succeed the tonic; the head and eyes are often turned to one side; the arms and legs are thrown about in all directions; there is frothing at the mouth; biting of the tongue, which colors the saliva with blood; urine is passed; respiration is difficult and deep. Then there is a period of cessation of all the symptoms, after which the person may fall into a deep sleep. In some cases this convulsion is soon succeeded by another, and there may be any number of attacks following one another, constituting "status epilepticus," during which the temperature rises very high, and in some cases the person is found paralyzed on one side after the attacks cease, —postepileptic paralysis,—from which he recovers. In other cases the attacks are characterized entirely by psychic disturbances. The patient may undress in the street, expose his person, or he may even commit crimes, such as breaking things, or killing his own children or other people; or he may shout and sing, and have a true maniacal seizure. After the attacks of grand mal he always complains of being sore in the muscles, owing to their convulsive action; and there are frequently small ecchymotic spots under the skin.

Prognosis.—This is a chronic condition. Some cases are very much benefited by treatment, and in a few cases cure occurs.

Treatment.—Attention to the diet and the regimen is the most efficient agency in the treatment of this condition. The use of bromids, given cautiously and watched, increasing the dose gradually, is of great value in the acute stages of the disease. Avoid stupefying the patient. The bromid should be given between meals, in water or Vichy, as recommended by Seguin. Absolute withdrawal of all salt from the food of the patient seems to allow a better action of the bromids with smaller doses and hence less danger of bromid poisoning. Tonics are indicated in these cases, and quinin is the best, in small doses; or small doses of arsenic, cod-liver oil, and nutritious food; if there is a tendency to indigestion, pepsin may be given. In those cases where a study of the convulsive seizure or sensory aura gives evidence of a localized lesion, and in all cases due to fracture of the skull, the question of trephining may have to be considered.

Bibliography.—Gowers, Epilepsy, London, 1901. Féré, Epilepsie. Binswanger, in Nothnagel's series.

CHAPTER III.

VASOMOTOR NEUROSES.

THERE is a large class of affections in which the symptoms are largely referred to the circulatory system. By many they are regarded as affections of the sympathetic nervous system. In some the blood-vessels themselves play an important part in the development, if not the causation, of the phenomena. Their pathology, however, is quite undetermined, and they present at best a motley group, with, at times, certain superficial resemblances.

Headache, cephalalgia, or migraine proper is placed in this group for lack of better nosologic position.

HEADACHE (Cephalalgia).

Headache, the result of organic brain disease, such as tumor, is not included under this head.

Any cause which lowers the general tone may give rise to it, such as anemia from any source, the presence in the blood of material foreign to it, or the permeation of the organism by poisonous substances—tobacco, lead, products of defective assimilation, etc. It may be the result of irritations and disturbances in other parts of the organism, such as disorders of the stomach, constipation, disease of the teeth, nose, throat, or eye; or it may occur from sleeping in badly ventilated rooms, from the inhalation of deleterious gases. It also occurs in gout, in rheumatism, and in neurasthenic individuals. It varies very much in its severity; it may be constant or intermittent, general or localized. An attempt has been made to classify these headaches according to their cause, and it is believed that certain sources of irritation give rise to a headache localized in a special part of the head; for instance, the headache of indigestion and constipation is frontal, while the headache of anemia is on the top of the head. The location of the headache is not always a guide to its etiology.

Anemic headache occurs mostly in women; it may be diffuse, on the top of the head, or the temples; it is found in pale and bloodless persons; it is often associated with fainting attacks; it is made worse by want of nourishment, rest, and sleep; overwork and anxiety increase it.

Congestive headache is found mostly in men, and is associated with full vessels, congested face, throbbing arteries, and vertigo, with a feeling of fulness in head.

Hysteric and neurasthenic headaches are very much alike, and are often located on the top of the head or on one side, described as boring; made worse by worry and menstruation.

Toxic headaches are usually general, but they may be frontal; tobacco, opium, iron, and other drugs may cause it. Seguin has pointed out that the headache of uremia is often occipital.

Syphilitic headache is often very severe, and may be general or localized; is apt to be worse at night; is usually constant.

Headache occurs in children who are of a nervous temperament and use their eyes too constantly or tax their brain beyond its endurance and powers, and who are worried and anxious about their work. Sinkler says it may be associated with enlarged tonsils.

The treatment of headache must depend upon its cause; this must be sought after. In the anemic headaches, tonics, arsenic, iron combined with a saline, if the person will tolerate it; nutritious food; some wine; cold bathing with friction. The digestion should be strengthened with some stomachic bitters, or pepsin may be given after meals; the bowels should be kept regular. In the syphilitic headache iodid of potassium; in the hysteric and neurasthenic headaches the treatment indicated for the anemic form is of service. In toxic headaches the cause must be removed. In nervous, highly neuropathic children, avoidance of overwork and anxiety, plenty of fresh air out-of-doors, plenty of light, nutritious food, cold bathing. In those cases which appear to depend upon strain of the eyes, if there is refractive trouble, it should be corrected, but this alone, in my experience, does not always cure the headache, but for the time relieves it; there is a neurotic condition, the basis of the cephalalgia; all sources of peripheral irritation should be sought for and corrected. The newer analgesics, antipyrin, acetanilid, phenacetin (5–10 grs.) are the best general remedies for headaches. They may best be combined with caffein, bromids, etc.

HEMICRANIA (Migraine; Sick Headache).

This is apparently a vasomotor neurosis with some special nifestations. Its most common cause is heredity and a ropathic constitution. It is more than likely that its uni- sality leads to an incorrect estimate concerning its relationships to the neuropathic constitution. While it seems perfectly true that many neuropaths have migraine, it is also just as true that many people have migraine who are not neuropathic. Excessive fatigue, anxiety, and worry often bring on an attack. It often begins in childhood or youth, and ceases at forty or fifty, but it may begin in advanced life. Intestinal toxemia is probably the most important exciting agent. It is most common in women.

It is characterized by headache which comes on in paroxysms and lasts for many hours. It is frequently located in one temple, and it is said in the left side most frequently. In a large proportion of the cases, however, it is more or less diffuse, extending backward to the occiput and neck or the top of the head, or it may be on both sides. The pain is usually dull, severe, and deep-seated, but there may be, from time to time, stabbing pain, as in common neuralgia of the fifth nerve. At the outset or during the attack there may be tingling and numbness in the side of the face or arm; indistinctness of vision, hemianopsia, difficulty in speaking, aphasia, flashes of colored light before eyes. The arteries of the side of greatest pain may pulsate with great force; the face may be red or pale; light, noise, and motion are distressing; vomiting may or may not occur; the pupil may be slightly dilated on the side of greatest pain. As the attack subsides there is an abundant secretion of pale urine. The frequency with which these attacks occur varies very much. It is susceptible of relief, but it is not curable. In the great majority of cases the visual phenomena precede the onset of the pain by some twenty to thirty minutes.

Treatment.—If the nutrition is impaired, as it frequently is in the neuralgias, tonics, nutritious diet, cod-liver oil, cream, etc., are indicated, also friction to the body by a coarse towel or rubbing with cold water. Among the medicinal remedies used extract of cannabis indica in $\frac{1}{8}$- to $\frac{1}{2}$-grain doses combined with quinin and continued for some time does most good. For the relief of the paroxysms a number of things may be tried: glonoin, guarana, citrate of caffein, aconitin, and antipyrin; the three last are the most efficacious and certain. Some persons are relieved by one remedy which gives no relief to another. A remedy which has been efficacious in one paroxysm may fail in the next. Morphin gives relief in some persons, but it is a dangerous remedy, as these persons are very apt to contract the habit of taking morphin in spite of their thinking they never will. Antipyrin requires to be given in 15-grain doses to adults. Relief is in some cases obtained by 5 or 10 grains of menthol in hot water. The newer analgesics offer the most fruitful class of remedies. If one is not serviceable, another may be tried with success. Intestinal antisepsis is a *sine qua non.*

VASOMOTOR SPASM AND PARALYSIS.

The blood-vessels are under the control of the vasomotor system of nerves. There is a vasomotor center, or, as it is sometimes called, monarchic vasomotor center in the medulla oblongata; each half of the body has its own center, stimulation of which causes contraction of all the arteries; paralysis causes an opposite dilatation. Under ordinary circumstances the center is in a state of moderate tonic excitement. It may be excited directly and reflexly, just as the cardiac and respiratory centers are. Besides this monarchic vasomotor center there are subordinate centers in the spinal cord; injury to the cord, therefore, causes dilatation of the blood-vessels; if the injury is high up in the cord, these subordinate vasomotor centers below the seat of injury, as soon as they have recovered from the shock, again control the blood-vessels and restore the tone of their muscular coat; they may, however, not do so completely. There are nerve-fibers whose stimulation causes the vasomotor center to produce a strong contraction of the arteries, and consequently a rise in the arterial blood pressure; these are called "pressor" fibers. There are also fibers whose stimulation reflexly diminishes the excitability of the vasomotor center; these are known as "depressor" nerves. Section of the vasomotor nerves, say in the cervical sympathetic, is followed by dilatation of the blood-vessels of the parts supplied by it; there are redness and increased temperature of the part, and there may be increased transudation through the vessels so as to give rise to a moderate edema.

This nervous mechanism may be injured or disordered in the medulla or in the spinal cord, the sympathetic ganglia, or in the afferent fibers. The vasomotor center in the medulla oblongata is influenced by the cerebrum, as is shown by sudden pallor in fright or blushing under some emotion. It is thought that it is a composite center, each part presiding over a particular vascular area. Poisons may excite the vasomotor nerves or paralyze them ; irritations at a distance may reflexly cause the same effect.[1]

There are observed clinically a number of conditions which are very evidently due to disturbances of the vasomotor system. The exact cause of disturbance in a given case is very often difficult to determine. Every possible source of peripheral irritation should be investigated—the condition of the pelvic organs, the kidneys, liver, heart, stomach, etc. It may be the result of the presence of some morbid product in the blood. It occurs very much more frequently in women than in men, and in persons whose nutrition is defective or who live in damp, malarious, and unhealthy places. It occurs usually between twenty and forty years of age.

These disturbances are shown externally in three ways: (1) Intense pallor, temporary in duration, coming on suddenly, with lowering of the temperature and pain, confined to some local area ; the fingers are the most frequently affected —one or more of them ; for this reason it has been called "digiti mortui" ; (2) it lasts a few minutes, then the pallor lessens, the warmth returns, and the natural appearance is restored ; these paroxysms may recur many times in a day ; this is the so-called angiospasm ; (3) or the condition may be the reverse—there is an angioparalysis—a vasomotor paralysis: instead of pallor, there is a more or less sudden redness in localized spots, with tingling sensation ; it gradually disappears after a few minutes ; it may occur in one or both hands.

A number of painful vasomotor neuroses have been described. S. Weir Mitchell has related a painful burning condition of the feet, confined to the plantar surface mostly, and in patches ; externally the parts look dusky red ; it is brought on by long standing or walking ; at first there may be a rise in temperature, with later some edema, swelling, coldness, and pallor in the part; he calls it "erythemomegalalgia." I have observed a somewhat similar painful condition of the feet in a young woman. It is most severe in the feet, but extends as high as the knees; both feet are affected; the pain is sharp and burning, and at times very severe; there is a very slight duskiness, but no swelling or edema; the temperature is not lowered. For the past twelve years she has suffered this painful condition during the summer months; she is perfectly free from it during the cold weather of autumn, winter, and spring. The pain is relieved by walking or standing; this is the reverse of Mitchell's case.

---

[1] For further information on this subject the student is referred to Landois' *Physiology* and Vulpian's *Leçons sur L'Appareil Vasomoteur*.

One is not infrequently consulted at the clinics and in private practice by sufferers from a painful condition of the hands and arms; it may come on at any time and is persistent; it is not accompanied by any changes in color or temperature; it is often worse at night, and appears to be influenced by the seasons and external temperature. In marked contrast with the condition of these women, who suffer only in the summer, is that of women who suffer only in the winter; in these cases the pain begins in the fingers of both hands on the approach of cold weather, with paroxysms of angiospasm which, on subsiding, are succeeded by paralytic dilatation, so that the hands become dark purple, swollen, and painful. Ulcerations occur, usually at the ends of the fingers. These ulcerations begin with severe pain in the end of a finger; then there is observed a small black spot—a small hemorrhage (note the similarity between this condition and the ecchymotic spots in locomotor ataxia)—which gradually changes into brown as the extravasated blood is altered, followed by ulceration with loss of tissue. The hands now become so painful, swollen, and purple that they cannot be used. On the approach of warm weather this condition improves, but there still remains evidence of the ulcerations. The skin of the fingers is glossy, the nails are slightly ridged, and the fingers are of a lower temperature than normal. Both hands are fected and all the toes to a less degree.

Raynaud's Disease.—A vessel spasm, which is still e marked, was first described by Raynaud in 1862, and since been called Raynaud's disease, symmetric gangrene, or local asphyxia. It may begin in the same way as some of the conditions above mentioned, but this is not usual.

The disease may begin suddenly as a localized pallor. The hands are most frequently affected, then the feet; or it may be more general, when it affects the hands, feet, tip of the nose, and both ears. In these patients the pallor is usually accompanied with some pain of a tingling, burning character, but it is not severe. This is followed by a dusky appearance of the parts, which gradually deepens, finally becomes black and intensely cold; hence the name, symmetric gangrene, given to it. It is usually confined to the first phalanx of the fingers and toes, the tip of the nose, and the upper part of both ears; its extent varies in each finger. There is great danger of sloughing; the pulse may be feeble; the person looks distressed and anxious; he makes no complaint of discomfort. The manifestations of the vasomotor neuroses are numerous, but there is a marked general similarity among them.

Prognosis.—In some cases it is a most unfavorable condition so far as recovery is concerned; such was the result in Mitchell's cases. In others improvement occurs. The severe cases of symmetric gangrene appear to recover more frequently than any others.

Treatment.—This must be directed to discover any sources of peripheral irritation or the presence in the blood of abnormal products, etc.

A great deal has been done in the way of medication, often without satisfactory results. If the general health is poor, a building-up treatment should be adopted: tonics, quinin, arsenic, strychnin, with ample nutritious diet, residence in a healthy, dry locality, with out-of-door life and freedom from anxiety if that be possible. Galvanism to the spine has been used. In severe cases the vascular spasm may be relieved by belladonna, or chloral may be used to relieve the pain, provided the condition of the heart does not contraindicate its use. The parts should be kept warm with hot, dry flannel. If the pulse is feeble, stimulants or small doses of morphin and digitalis may be given.

EXOPHTHALMIC GOITER (Graves's Disease).

Etiology.—This disease occurs almost exclusively in women. Heredity plays a prominent part as a predisposing cause. Disturbances in nutrition, anemia, chlorosis, drains upon the system by profuse discharges of blood, illnesses which lower the vitality, are exciting causes of its outbreak. Mental anxiety and disappointments are fruitful sources of it in predisposed persons. The disease is usually observed in those persons who have in their families or their ancestors grave mental disorders, such as insanity, epilepsy, etc. It may occur in several members of the same family. Much has recently been written on the influence of the thyroid gland in the production of this grouping of symptoms. Many believe that the diseased or perverted function of the thyroid is the prime disorder. The diseased gland throws into the circulation, through the lymphatics, a material which is toxic in its effects—a colloid material; hence all the other symptoms that appear are the result of the presence in the blood of this poisonous material. Another theory is that the symptoms are all the result of a disordered state of the central nervous system—that the disease is really a neurosis.

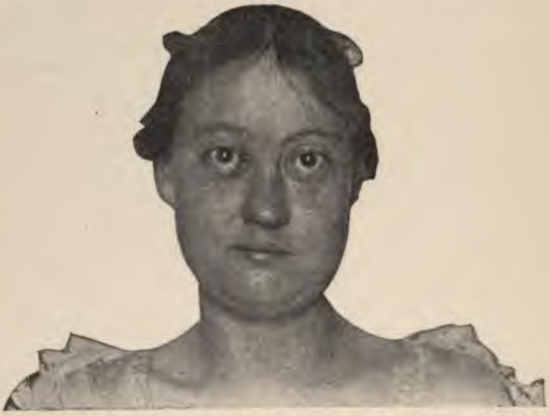

FIG. 5.—Exophthalmic goiter: partial recovery. Some exophthalmos, pigmentation of skin, and goitrous thickening remain (Church).

Symptoms.—It begins with palpitation, rapid pulse, which may reach eventually 120 or 150 beats a minute; it may begin gradually, or the symptoms may be ushered in suddenly, as the result of fright or other profound emotional disturbance. Enlargement of the thyroid gland occurs as a very constant accompaniment; the degree of enlargement varies very much; vomiting occasionally occurs, with dyspeptic symptoms, and there may be a disposition to vomit when certain kinds of food are taken. The appearance of these symptoms varies. In some cases there is a slight swelling of the thyroid gland in its entirety or in one lobe for a number of months before the palpitation occurs; in others the palpitation is the first to appear.

Exophthalmos, more or less extensive, soon appears; it may be so great that the lids cannot be closed over the eyeballs. Von Graefe pointed out that the upper lid loses its power of moving in harmony with the movements of the eyeball. In some extreme cases ulcerations of the cornea may occur and the sight be lost in consequence. Slight elevation of the temperature may occur. The person is exceedingly nervous, easily agitated, and frightened. The rapid pulse, a general nervous agitation, and restlessness with anxiety may precede for some time the other symptoms. There may be a moderate diarrhea in some cases, which may be persistent or intermittent. Occasionally edema of the eyelids is present. The group of symptoms that constitute Graves' disease have been known to occur suddenly upon intense emotional excitement of a depressing or terrifying character, and to disappear entirely after a few weeks (Fig. 5).

Pathologic Anatomy.—Changes have been found in the thyroid gland and in the cervical sympathetic and its ganglia. Greenfield, in speaking of these changes, says that what appears to be the earliest change in the thyroid gland is an alteration of the epithelium from the cubical to the columnar type, with greatly increased proliferation, similar to that seen in adenomata. In addition, there appear to be active secretion and absorption of colloid material, which is replaced by a more mucinous fluid. Desquamation of the altered epithelium is common; masses of columnar epithelium lie free in the spaces, which may be dilated. There are often elongated, duct-like spaces which suggest the idea of ducts in the gland. There is, in addition, the production of an enormous number of newly formed tubular spaces lined with a single coating of cubical epithelium, corresponding to the tubules of secreting glands. There is usually no increase in vascularity, but rather a diminution. In the central nervous system the changes were found mainly in the medulla oblongata and pons, but they are not distinctive. Minute hemorrhages were frequent; many were found in the floor of the fourth ventricle—dilated vessels filled with leukocytes. The ganglion-cells were found in a state of atrophy, with cloudy swelling of some of them. The changes in the sympathetic were of a similar nature.

Diagnosis.—When the symptoms are well developed, it presents no difficulty. Constant rapid pulse with general nervous agitation should make one suspicious of this disease in its early stage, when the symptoms cannot be readily accounted for by other morbid states.

Prognosis.—Many of the cases improve, but there is great danger of relapse.

Treatment is unsatisfactory. Digitalis and other remedies for slowing the heart's action have been given with very little result. If nutrition is impaired, tonics, quinin, arsenic, and iron, with nourishing diet, change of scene, cold sponging, galvanism, and removal of any source of anxiety which it is possible to relieve are needed. Faradism has been advocated.

Recently, thyroidectomy, complete or partial, has been recommended and used in cases where other means have failed to give relief. It is not always successful, and there is some danger of death following rapidly after the operation, but the percentage of cases that have been benefited is sufficiently large to warrant an operation in severe cases where other means have failed. The benefit from an operation should not be considered as supporting the theory of the toxic effect of the disordered thyroid product, as the good result may well be the effect on the nervous system of the operation, as has been suggested by Gowers and Putnam. Thyroid gland has been used, but, on the whole, has given no good results. If the theory referring the symptoms to an increased and abnormal production of thyroid secretion is correct, it would be contraindicated. Thompson is the advocate of a line of treatment that is based upon a theory of the disease which he has propounded. His theory is that the symptoms are the result of the presence in the blood of a poison absorbed into the system from the intestinal tract, where fermentation- and decomposition-processes have been going on—gastro-intestinal ptomain poisoning. He advises a milk diet and the use of remedies to arrest intestinal fermentation, such as phenol-bismuth, salol, bismuth salicylate, etc. Galvanism to the enlarged gland and to the cervical sympathetic in the neck certainly diminishes, for a time at least, the pulse-rate and the size of the gland. Perhaps the frequent application of this remedy may give a permanent result. On the other hand, the pulse-rate and the size of the glands have been known to diminish without the use of galvanism. Freedom from anxiety and worry, with remedies to allay the nervous irritability, is of greatest importance. Belladonna in increasing doses has at times been of benefit. Glycerophosphate of soda has recently been recommended. Cervical sympathectomy is highly advocated by the Hungarian surgeon Jonnesco.

UNILATERAL FACIAL ATROPHY.

This, as its name implies, is a gradual wasting of the muscular tissue on one side of the face.

Etiology.—It is more frequent in women than in men; it occurs usually at a comparatively early age,—under thirty,—and in a few cases recorded, between ten and fifteen years of age. It appears to occur more frequently on the left side of the face.

It has followed the eruptive fevers, pertussis, and other diseases. In a few cases there has been pain in the superior maxillary region; its etiology is not clear.

Symptoms.—It begins as a discoloration on the side of the face in spots, which spread; these spots become yellowish and depressed; the face gradually grows thinner on that side as the tissue gradually wastes; the hair undergoes changes as well as the skin, and may become perfectly white. The cutaneous sensibility is usually not affected; the skin becomes drawn, wrinkled, and hard, but it is not adherent to the bone. The electric reactions are, as a rule, said to be normal. The degree of atrophy varies very much. The bones have been found diminished in size.

Pathology.—Two theories are offered in explanation of this condition: one is that it depends upon a disorder of the vasomotor system; the other, upon a disorder in the trophic fibers of the fifth nerve. It is difficult at present to say to which of these two theories the greater weight should be given. The disease may depend upon a disturbance in both, as the fifth nerve and sympathetic are so intimately associated. Cases have been recorded in which injury to the sympathetic has appeared to cause it.

Diagnosis.—It may be mistaken for an asymmetric face, but in this condition there is absence of the discoloration and atrophy.

Prognosis.—It is not dangerous to life.

Treatment.—Very little can be said on this subject.

SECTION II.

DISEASES OF THE PERIPHERAL NERVOUS SYSTEM.

CHAPTER I.

THE PERIPHERAL SENSORY NEURONS—ANALGESIAS AND NEURALGIAS.

ALMOST any of the sensory nerves may be affected in such a manner as to cause pain. In a number of diseases, notably in neurasthenia, some disturbance in their metabolism gives rise to peculiar tingling sensations, not painful, but annoying; such have been termed *paresthesias*. At times such tingling sensations have associated cold sensations, when they are termed *acroparesthesias*. Loss of sensation may take place in a large number of affections, but there are few isolated *anesthesias* or *analgesias* save as a result of injury. Analgesia or anesthesia is a characteristic symptom in some hemiplegias, in some cases of transverse myelitis, in many of the atrophies, and in syringomyelia. There is a sensory type of peripheral neuritis.

NEURALGIAS.

Painful affections are widely distributed. Those which show a comparatively distinct localization have received distinct names. The commonest forms of these localized neuralgias are:

Coccygodynia.—This is a neuralgia affecting the lower sacral nerves in their posterior branches. It occurs more particularly in women, and is a direct result, for the most part, of injury done to the pelvic floor, as a result of child-birth, of constipation, or of pelvic disease, or following an accident.

The symptoms are those of pain during walking and sitting, felt especially at the end of the spine, and difficult and painful defecation.

Tarsalgia.—This is a form of neuralgia which affects the feet, particularly in those who stand or walk much. Shop-girls, waiters, postmen, and policemen are most often affected. The affection is largely due to the injury done to the arch of the foot by the weight thrown upon it. Flatfoot is a common accompaniment.

Morton's tarsalgia is a special form found in women, particularly those who have loosely articulated and delicate bony structures in the foot. The nerves are frequently pinched between the third and fourth metatarsophalangeal joint.

These foot forms of neuralgia are best treated by suitable shoes. Casts of the foot are made, and appropriate supports constructed on these lines.

Plantar neuralgia occurs in the plantar nerves.

Lumbo-abdominal neuralgia (*lumbago*) affects the lumbar nerves and is at times a very persistent type of this affection.

Neuralgia paræsthetica is a mild form of femoral neuralgia accompanied by paresthesias.

Mammary neuralgia, intercostal neuralgia, digital neuralgia, cervicobrachial and **cervico-occipital neuralgia** are other special types.

Cervico-occipital Neuralgia.—This is characterized by pain in the distribution of the occipital nerve, but it may and often does radiate into the distribution of the cervical nerves.

Cervicobrachial Neuralgia.—The pain here is in the distribution of the cervical and brachial nerves, and is of the same character as in the neuralgias of the fifth nerve, but more constant and dull and less exactly localized.

Trifacial Neuralgia.—Heredity is said to play a part in its predisposing causes. It has been observed to affect several generations of a family. It is frequent in those predisposed to neuralgias and other nervous diseases. It is most common in middle and advanced life; it is more frequent in women than in men. Anemia and general disorders of nutrition, from whatever cause, predispose to it. Malarial infection is a common cause; cold drafts from open windows, wounds, diseases of the parts in the neighborhood of the nerve and its branches, disease of the cranial bones, periostitis, exostosis, injuring the nerve as it passes through its bony canals; intracranial tumors; tumors developing on the nerve itself. Disease of the teeth and nose is an occasional cause.

Symptoms.—Pain in the distribution of the nerve of more or less severity; it is sharp, shooting in character, coming on in paroxysms. The entire nerve may be involved, but the ophthalmic or supra-orbital branches are the most frequently affected.

Supra-orbital Neuralgia.—In those patients in which the superior or inferior maxillary branches are implicated, the pain is felt in the teeth. If the attack is severe, there is constant pain, with paroxysms of intense, lightning-like pain. If the attack has been of some duration, tender spots will be found at various places, usually where the nerve becomes more superficial. The skin is often hyperesthetic, and in some chronic cases there may be some anesthesia. After the attack is well established, the face is red and the local temperature may be elevated. The arteries on that side pulsate violently, and there may be an abundant flow of tears.

Prognosis.—The majority of these cases recover, but there is a proportion which are very obstinate—those in which serious nutritive changes play a part in the causation. There is also a proportion in which medicinal treatment does very little good.

Treatment.—In those which have a suspicion of malaria as the exciting cause quinin, 5 or 10 grains at night, and $\frac{1}{200}$ of a grain of aconitin taken two or three times a day, preceded by a mercurial cathartic, will almost certainly cure them. This treatment will often cure cases that are apparently not malarial. Sometimes 15- or 20-grain doses of phenacetin will give the desired result. If there is anemia, iron in one of its preparations should be given, or arsenious acid and a generous diet, with butter, fats, cream, or cod-liver oil and fresh air with moderate exercise. In some troublesome cases phosphorus may give some benefit. If it is suspected that the neuralgia is caused by carious teeth, they should be examined by some good dentist. Those cases dependent upon disease of the bones must be treated by the surgeon. In those cases incurable by medicine operations on the nerve have often given relief for long periods of time. There is a tendency to recurrence of the pain even in these cases. As a final resort, the Hartley-Krause operation should be performed.

HERPES ZOSTER.

This name is given to an erythematous and papular eruption which comes on as a trophic symptom in neuralgia. The eruption is always along the course of a nerve or its branches. It is preceded by the stabbing pains and by a tingling, itching sensation along the course of the nerve or its branches. The eruption is very frequently in patches. The pustules may suppurate, and when they are large, leave scars; or they may simply dry up and disappear without any after-symptoms. At times when it occurs in elderly persons there is a painful neuralgia in the nerve after the subsidence of the eruption, and it may last for years, indicating probably a serious change in the nerve. It may be found in association with neuralgia of almost any nerve—the fifth, the intercostals, those of the lumbar and sacral plexus. When it is in the fifth nerve, it is the supra-orbital branches that is its seat, and if the ophthalmic branches are involved, there is danger of trophic disturbances of the cornea.

It is sometimes apparently due to epidemic influences.

CHAPTER II.

DISEASES OF THE PERIPHERAL MOTOR OR MOTOR-SENSORY NEURONS.

INJURIES OF NERVES.

THE nerves may be injured as the result of gunshot wounds; tearing injuries by machinery; cutting by dull or sharp instruments; by falls; or from the pressure of cicatrices, tumors, bony exostoses, aneurysms in the subclavian, popliteal, or other arteries; from pressure during parturition; as a complication in fractures and dislocations; or from punctured wounds of the nerves themselves.

Symptoms.—Pain is constant; it may be slight or severe; it is of a shooting, burning, or tearing character; most marked in the terminal distribution of the nerve or nerves injured, accompanied with a feeling of numbness and heaviness in the parts involved. Pressure on the inflamed nerve causes shooting, tingling pain radiating toward the periphery.

S. Weir Mitchell first described a painful burning sensation in the parts, under the name of causalgia. These pains are often associated with glossy skin. In addition to this burning sensation, the parts are exquisitely sensitive; the least touch increases the pain. Exposure to the air and contact are to be avoided; the parts should be kept carefully covered with cloth, oil, water, vaselin, etc. As the pain increases the temper becomes irritable, sleep is disturbed, the face exhibits a distressed expression. In severe cases trophic disturbances occur,

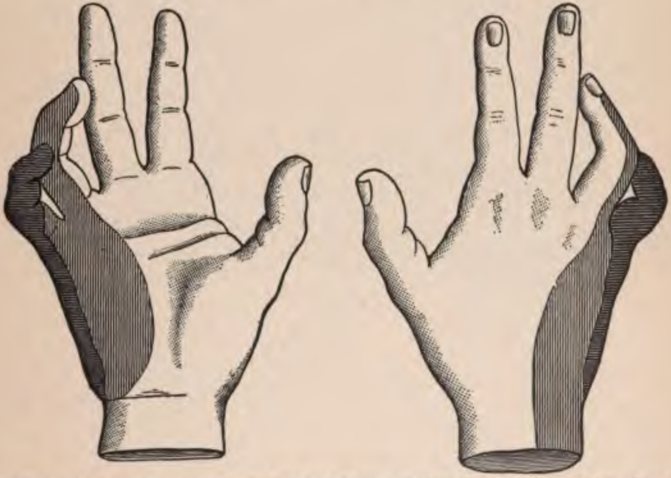

FIG. 6.—Showing sensory loss and ordinary position in injuries of the ulnar nerve (Bowlby).

LANE LIBRARY

the parts are bluish from impaired circulation. Bullæ may appear; there may be a little swelling of the entire limb below the injury, but greatest at the extremity; the joints are slightly swollen and inflamed. The muscles in the distribution of the injured nerve may atrophy, and sometimes this atrophy is exceedingly rapid, and contracture more or less marked may follow. Changes in the nails are observed; they become deformed, brittle, curved, lose their smooth external surface, and appear roughed and ridged. Anesthesia is present in the severe cases, and is in the distribution of the injured nerve (Fig. 6).

Ulcerations may occur in the parts supplied by the nerve; the skin and deeper tissues may slough in spots; the surrounding parts are red and inflamed (Fig. 7).

Diagnosis.—The history of an injury in the neighborhood of the nerve, the constant peculiar pains, the burning sensation, its limitation to the distribution of a single nerve or to a set of associated nerves, and the trophic disturbances described, render the diagnosis comparatively easy.

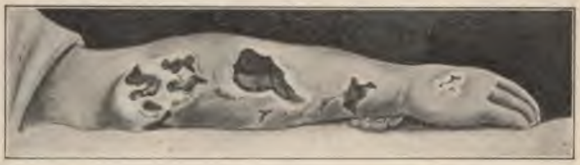

FIG. 7.—Showing the ulcerated surfaces on the ulnar side of the forearm in a case of injury to the ulnar nerve by puncture.

Prognosis.—Depends entirely upon the severity of the injury and the possibility of aid by medicinal or surgical means. Recovery is slow, even in the most favorable cases.

Treatment.—In division of the nerve, suture of the divided ends of the nerve is indicated after a careful study of the case. For the indications and the methods of applying the suture, consult the special works on injuries of nerves and works on surgery.

In nerve injuries from pressure the removal of the pressure is the first thing to be done if that is possible. In cases of lacerated wounds of the nerves, removal of any foreign body from the wound, soothing applications to the inflamed part, later, after subsidence of the inflammation, mild galvanism. If there results much inflammatory pressure or the nerve is so badly lacerated that improvement does not occur, the advisability of cutting down and suturing the ends must be considered.

When the pain is very severe, morphin will be necessary to give relief, especially at night.

NEURITIS.

This is an inflammation of the peripheral nerves; it may affect only one nerve, such as the median or ulnar, or almost all the nerves may be affected, when it is called polyneuritis or multiple neuritis.

It is characterized by pain in the distribution of the nerve or nerves diseased; the pain is constant, but there are paroxysms of sharp, needle-like stabs of greater or less severity; a sensation of tingling, heaviness, and formication is not infrequent. It has numerous causes, and as the etiology somewhat modifies the clinical picture, we will consider some of the cases from the standpoint of causation.

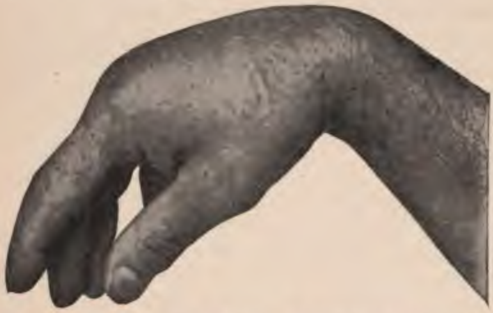

FIG. 8.—Characteristic position of hand in musculospiral palsy (Church).

It may occur without any assignable cause in the median or ulnar nerves, even in the musculospiral, as a somewhat acute condition. There is a feeling of pain, aching, and oversensitiveness in the peripheral distribution of the nerve, and to a greater or less extent in all the distal side of the diseased nerve. It will be found tender to pressure, and sometimes exquisitely so. In some cases the parts are a little swollen and the color is darker; there may be a burning sensation in the peripheral distribution of the nerve, and if the case is severe, all the symptoms described in cases of injury to nerves (Fig. 8).

In neuritis of the median the thumb, index-finger, and the palm of the hand are the seat of the burning pain. If the case is severe, glossy skin, bullæ, and changes in the nails, etc., may follow. (See Injuries to Nerves.)

In these cases of acute and subacute local neuritis the nerves in the upper extremity are more frequently affected than any others.

Diagnosis.—The distribution of the pain to one nerve; the peculiar pain; the burning sensation, etc.

Prognosis.—Most of these cases recover under treatment.

Treatment.—Active blistering with cantharidal collodion along the course of the nerve; applying another blister as soon as the last one has nearly healed; the actual cautery may be used, but it is not nearly so efficacious as the blister. Iodid of potassium is sometimes used internally, but its utility is doubtful. Mild galvanism appears to give relief if used often enough. Hot-water applications are beneficial in the shape of douches. There should be complete rest of the part; for the relief of the pain phenacetin or acetanilid may be used, but if the pain is very severe, they are not sufficiently effective. Aconitin sometimes gives relief. Morphin with atropin is most effective to relieve pain and secure sleep.

Multiple Neuritis.—This is an acute or subacute neuritis affecting all four extremities, and characterized by weakness or paralysis, accompanied by atrophy, pain, and tenderness.

Etiology.—This affection is eminently one due to toxic agents, either inorganic or organic, or it may follow exposure to cold and wet. Anemia is an important predisposing factor.

Of the inorganic poisons, mercury, lead, arsenic, copper, phosphorus, alcohol, carbon monoxid, arseniureted hydrogen, etc., are exciting causes. The organic poisons of the infectious diseases, notably beri-beri, diphtheria, typhoid, scarlet fever, measles, syphilis, pneumonia, and tuberculosis, are other exciting causes. Malaria among the animal parasitic diseases is a not uncommon cause. Diabetes as an acid intoxication is an allied causative factor.

There are four well-differentiated types now recognized on general etiologic grounds:

(1) *Motor Type.*—This is characteristic of the metallic poisons, alcohol, and exposure.

(2) *Sensory Type.*—This follows many metallic poisons, the infectious diseases, diabetes, etc. This type affects the sensory neurons and causes much incoördination. In some patients, syphilitics particularly, it is claimed by competent observers that the mercurial treatment may bring about a pseudotabes. Other forms of this type are frequently mistaken for locomotor ataxia and *cured.*

(3) *Epidemic Types.*—Seen in beri-beri.

(4) *Acute Pernicious Type.*—This is, perhaps, identical with Landry's paralysis.

The commonest form is perhaps alcoholic multiple neuritis.

Alcoholic Paralysis.—At least two-thirds of the cases occur in women. The lower extremities are the most affected, but it not infrequently affects all extremities, and the pneumogastric and the muscles of the face may be involved. Its onset is usually gradual. A creeping, tingling sensation with soreness is felt in the extremities; soon motor symptoms appear; the extensors are the first muscles to be paralyzed, producing in the lower extremity dragging of the foot, and in the upper, wrist-drop. There are sharp, shooting pains in the parts affected. There is marked tenderness of the muscles to pressure if the extremities are seized suddenly or grasped firmly. The patient screams out with pain. This is commonly observed in women who are apt to be emotional and exaggerate their sufferings. There is a painful tingling in the soles of the feet, which is much increased by standing. The patients walk with a hobbling gait and great caution, fearful of increasing the pain. The paretic extremities are edematous and bluish, owing to defective circulation. The tendon-reflex is usually lost. In not a small proportion of these cases there is mental enfeeblement—the memory is defective, and they may have delusions and illusions. There may be some muscular wasting, but it is not great in the majority of cases, the muscles becoming flabby and soft. Muscular atrophy may occur in the cases which become chronic. Then it is *en masse*, as a rule, and there is partial reaction of degeneration. There may be retarded and perverted sensibility. In severe cases contracture may occur.

Diagnosis.—The alcoholic history; the association of the motor weakness with the characteristic sensory symptoms in the extremities; the painful tingling in the feet when the patient stands; the excessive tenderness in the muscles; and the mental enfeeblement make the diagnosis.

Prognosis.—A large proportion of these cases recover in from six months to one year.

Treatment.—Complete abstinence from alcoholic liquors, ample nutritious diet and keeping the extremities warm; hot and cold douches; tonics—large doses of quinin and strychnin. For the relief of the pains some of the remedies recommended in acute peripheral neuritis. Electricity is invaluable.

Diphtheric Neuritis.—Diphtheric paralysis occurs usually several weeks after the disappearance of the diphtheric symptoms, and during the period of convalescence or after it. The muscles of the pharynx and deglutition and of the neck are the most commonly affected; the voice becomes thick and indistinct; there is difficulty in swallowing; perhaps fluids come out through the nose in efforts to swallow, owing to paralysis of the soft palate. The paralysis in the muscles of the neck may be so decided that the child cannot hold the head erect. The paralysis of the extremities may be so slight as to cause only an unsteadiness of walk. One or more of the eye muscles may be paralyzed, and it is said one or both of the facial nerves may be affected. In severe cases the paralysis may be very decided and reflex action may be abolished, and there may be some disorders of sensibility, but they are not marked. None of the pain observed in alcoholic neuritis is present. The appearance of paralysis has no relation to the severity of the diphtheric manifestations in a large number of the cases. Paralysis is known to follow very mild cases of diphtheria. In some cases the sore throat nd constitutional symptoms are so mild that the children un about and it is not suspected that they have diphtheria.

Diagnosis.—The diphtheric history. The gradual development of a paresis during or after convalescence; its great tendency to affect the muscles of deglutition and the neck; its great frequency in children as compared with adults; the absence of marked sensory symptoms.

Prognosis and Treatment.—The uncomplicated cases usually recover after some weeks. If the pneumogastric is very much involved or there is bronchitis or pertussis, the prognosis is grave. Tonics and nutritious diet, with cod-liver oil, fresh air if the weather admits of being out-of-doors, and at the same time warm clothing.

Lead Neuritis.—This occurs in persons who have been exposed to lead, such as workers in manufactories of white lead, and painters who are not careful to keep their hands clean. It first shows itself by increasing anemia and constipation, attacks of abdominal pain, and "lead colic." There may be some pain in the joints and limbs, and a gradually approaching paralysis of the upper extremities—usually both. The extensors of the forearms are most affected, so that when the arms are held out, the hand hangs down and cannot be extended from the wrist—"wrist-drop." The common extensors of the fingers are first involved; then the extensors of the index and little finger and of the wrist. The supinator longus is not paralyzed unless in cases of exceptional severity. There is swelling of the back of the wrist from prolonged overflexion. The lower extremities may be affected, but these cases are quite uncommon. The tongue is coated, breath offensive, and there is usually a characteristic blue line at the junction of the teeth and gums. There are fewer sensory symptoms, pain, etc., than in alcoholic neuritis. There may be disturbances of vision due to optic neuritis or atrophy of the optic nerves; and even mental impairment has been observed, but it is not frequent. A certain amount of tremor may exist.

Diagnosis.—The exposure to lead; the peculiar abdominal pain; the wrist-drop with conservation of power in the supinator longus; the blue line at junction of gums with the teeth; the intense pallor, etc.

Prognosis.—These persons usually recover after a number of months if the cases are not of great severity.

Treatment.—Sulphuric acid or some of the alkaline sulphates to wash out and eliminate the lead. Later, iodid of potassium in moderate doses. If there is much abdominal pain, it should be relieved with opium or codein. The skin should be kept active by moderately warm baths and rubbing; the mouth and teeth should be brushed twice a day; faradism or galvanism to the paralyzed muscles; later, to relieve pallor, mild ferruginous tonics.

CHAPTER III.

PARALYSIS OF MUSCLES SUPPLIED BY THE PERIPHERAL MOTOR NERVES.

SUCH paralyses may be the result of injury (*q. v.* p. 48) already discussed, of neuritis, or of some disease in the nerve or contiguous structures giving rise to pressure or destruction. Many of these paralyses may be due to nuclear lesions, and in many instances it may be impossible to diagnosticate the presence of a peripheral or a nuclear lesion.

Paralysis may occur in any of the nerves supplying the eye muscles, but paralyses of the third and sixth nerves are the most common.

Paralysis of the Oculomotor.—This is most commonly caused by syphilitic lesions in the course of the nerve. It may occur after diphtheria, or in persons suffering from diabetes or from intracranial tumors; from disease of the nucleus of origin in the pons, or from tumors in the substance of the brain injuring the nerve-tract.

If the entire nerve is paralyzed, there is drooping of the eyelid; and if it is extreme, the upper lid cannot be raised, owing to paralysis of the levator palpebræ superioris, causing a condition called ptosis. The superior rectus and the internal rectus are also paralyzed, and the eyeball is turned outward.

But there may be paralysis in only a branch of the nerve, for example, affecting the internal rectus alone, or ptosis and paralysis of the superior rectus; and there may be dilatation of the pupil, with loss of reaction to light. If the paralysis is confined to one eye, it is due to a lesion in the course of the nerve after its exit from the brain; if the lesion is in the nucleus of origin, the paralysis may be on both sides—there will be double ptosis, and both eyeballs will turn outward. If there is tumor in the midbrain, there will be the same condition. (See Diseases of the Brain.)

The **prognosis** in these cases will depend upon the pathologic condition which gives rise to the paralysis. If due to syphilis, recovery may be expected under antisyphilitic treatment; if due to non-syphilitic intracranial or intracerebral tumors, the prognosis is unfavorable. When it occurs in the course of diabetes, it may pass away. This may also occur in some of the cases of locomotor ataxia, but in others it remains permanent.

Treatment.—Electricity is sometimes applied in these cases. If there is evidence of syphilis, large and increasing doses of iodid of potassium.

Paralysis of the external rectus or sixth nerve has the same causes as operate in paralysis of nerves to the other muscles of the eye; it gives rise to convergence of the eyeball and double vision, or diplopia.

Testing these eye-muscles can be done easily and satisfactorily for a rough examination by having the person, while the head is fixed, look at your finger or a pencil held up in front of him, and moving it first to one side, then to the other, upward and downward, at the same time observing the action of the eye muscles.

Peripheral Facial Paralysis (**Bell's Palsy**).—This is a paralysis in the distribution of the facial nerve in part or entire.

Etiology.—Exposure to cold appears to be a frequent cause; it may occur at all ages, but is most common between twenty and fifty years of age. Persons who are the subjects of some nervous disturbances, such as hemicrania, headaches, neuralgia, etc., are more disposed to this form of paralysis. It occurs suddenly in a large number of the cases which are supposed to be due to cold or rheumatism. It may occur as the result of severe injuries to the head, causing fracture at the base of the skull, from saber cuts or wounds by bullets injuring the nerve. It may be the result of the pressure of tumors in the neighborhood of the parotid gland, from suppurative otitis with extensive disease of the bone. It may arise from the pressure of syphilitic periostitis in the bony canal or syphilitic meningitis and gummata, or in the course of the development of neoplasms (sarcoma and other tumors) at the base of the brain ; but the symptoms then are not single paralysis of the facial nerve ; other cranial nerves are involved, and other symptoms indicative of tumor are present.

Symptoms.—There may be some premonitory symptoms, such as a general feeling of discomfort, chilliness, some headache, slight pain about the ear or the side of the head, slight noise in the ear, or tingling sensation in the side of the tongue. Often the person awakes in the morning to find the face paralyzed on one side, or his attention is first called to it by some person. The entire side of the face is paralyzed, the nasolabial fold is obliterated, the lower eyelid droops down so that the tears run over the cheek ; there is a peculiar stare about the eye, owing to the paralysis of the orbicularis palpebrarum ; that side of the forehead looks smoother than the other ; all wrinkling of the skin is obliterated. If the person is asked to close the eyes tightly, he cannot close the affected eye ; the ball is only partially covered. If the tongue is protruded, the upper lip on that side is observed to hang lower than the opposite side ; it touches the tongue. In making an effort to whistle, the lips on the affected side do not contract as they do on the opposite side. The healthy side appears drawn up and leads the patient and friends to think that it is the affected side. This is due to the great contrast between the healthy muscles in tone and the flaccid paralyzed muscles on the other side. If the nerve is diseased external to the Fallopian canal, all the muscles of the face on that side are paralyzed ; if in the Fallopian canal and below the point at which the chorda tympani is given off, the muscles of the external ear in addition are paralyzed. If the disease is between the point at which the chorda tympani is given off, and the point of origin of the small branches of the stapedius, there are, in addition, abolition of taste in the anterior two-thirds of the tongue on that side and diminution of salivary secretion ; pain of a tingling and burning character in these parts may be present. If the geniculate ganglion itself is diseased, all the previous signs are present, and in addition paralysis of the soft palate and displacement of the uvula. At the very beginning of the paralysis there is an increased irritability to the faradic reaction, but this is, as a rule, soon lost, and the reaction of degeneration for galvanism develops. During the course of the disease there is a good deal of annoyance and distress, due to inability to close the eyelids; dust is blown in, and in high dry winds the tears are rapidly evaporated; the inability to cover the ball from time to time allows it to become dry, irritated, and painful. This is much less troublesome in moist, damp, foggy weather. The lip is in the way and often gets bitten when an attempt is made to bite or chew. Later, if the paralysis is not completely recovered from, there is a certain amount of contracture in the paralyzed muscles with a feeling of stiffness in them.

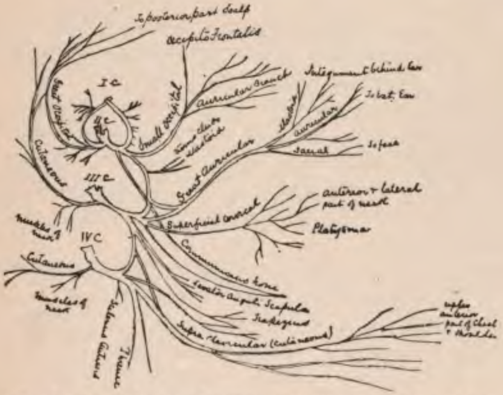

FIG. 9.—Cervical plexus of nerves (after Flower—Keen edition).

Diagnosis.—In peripheral facial paralysis all the muscles supplied by the facial are paralyzed. If the person is directed to close the eyes, he cannot close the eyelids on the paralyzed side. In the facial paralysis from cerebral disease only the lower facial muscles are affected, and he can close both eyes equally well. There is an exception to this, and it is when there is a lesion in the pons or medulla; but these cases are exceedingly rare. (Refer to chapters on Diseases of the Brain.)

In cases due to fracture at the base of the skull there will be a history of severe injury, with perhaps bleeding from the ear, etc. From disease of the bones of the ear there will be a history of old suppurative inflammation of the middle ear, with an offensive bloody discharge.

In the paralysis due to syphilitic disease there will be headache and a slowly advancing paralysis—not sudden, as is the case with the common variety; also a history of syphilis, and there is very likely to be paralysis of some of the other cranial nerves—those supplying the eye-muscles are much oftener affected.

Prognosis.—In the cases due to fracture at the base of the skull, to caries of the temporal bone, and to intracranial tumors the prognosis is unfavorable. In those cases clearly due to syphilis, under appropriate treatment, recovery is the rule. In the cases due to cold, recovery is complete in some of the cases after a few weeks; in the more severe cases recovery occurs only after six or eight months, and there is very apt to remain some slight impairment of the muscles and nerve on that side.

Treatment.—Galvanism is to be applied every day to these paralyzed muscles. If there is much pain about the ear, a small blister will afford instant relief. If the person is in poor physical condition, tonics should be given. Iodid of potassium is sometimes given in these cases, but it is doubtful if it is of any value except in cases which are clearly syphilitic; then it should be given in steadily increasing amounts until very large doses are taken; inunctions of mercurial ointment should be used as well. In the cases due to intracranial tumor, unless gummata, there is no treatment which does any good. In the cases due to middle-ear disease the condition of the ear requires treatment.

Paralysis of the median nerve causes inability to pronate and grasp objects with the hand, except with the two fingers which are supplied by the ulnar nerve. There may be a good deal of anesthesia in the distribution of the nerve. Its most common cause is injury.

Paralysis of the ulnar abolishes the power to flex the last two fingers, of separating or of compressing them against the middle finger, of flexing the first and extending the second and third phalanges of all the fingers, and of adducting the thumb and placing it against the metacarpal bone of the index-finger. If the interossei and lumbricales are alone paralyzed, the combined traction of the extensors and flexors of the fingers produces hyperextension of the first and flexion of the last two phalanges, and the hand assumes a claw-like appearance.

Paralysis of the Musculospiral Nerve.—This is most frequently due to injuries as it winds around the humerus. One of the most common causes is compression of the nerve from lying on the arm in such a way as to press against some hard substance. This frequently occurs in drunkards, who fall in almost any place—on a hard floor or on the stones in the street. When they awake the next morning, the arm is found paralyzed; they cannot extend the wrist and the fingers; the thumb is flexed and abducted; they are unable to supi-

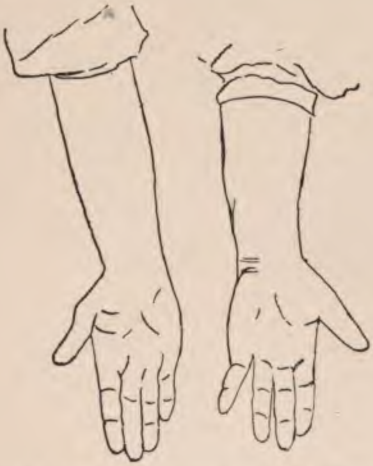

FIG. 10.—Paralysis of the ulnar nerve (clinic, Long Island College Hospital; Dr. Wm. Browning's case. From a photograph by Dr. C. N. Hoagland).

nate the forearm; and it will be found that the supinator longus is paralyzed. This can be shown by having the patient flex the forearm upon the arm, and make resistance to passive extension. If, while one makes the effort to extend it, a finger is placed on the supinator longus just below the elbow, it will be found to be quite flaccid—paralyzed. In plumbism the paralysis in the upper extremities is in the distribution of the musculospiral, and it presents, therefore, in that respect the same symptoms as in the condition under consideration. This difference in the condition of the supinator longus can be used as one of the points of differential diagnosis. In lead paralysis it is not involved; in paralysis from pressure it is. It is paralyzed by improperly adjusted crutches and by injuries which partially or entirely sever the nerve. In these cases there is anesthesia on the back of the hand and forearm.

Paralysis of the circumflex nerve is shown by paralysis of the deltoid. The arm cannot be raised upward or outward; the muscle is observed to remain relaxed in these efforts, and it frequently undergoes atrophy. Its most common cause is injury by falls or blows, and the muscle is more or less injured at the same time. There may be some slight aching about the shoulder.

Paralysis from Injury of the Brachial Plexus (Obstetric Paralysis; Duchenne-Erb Paralysis).—This is a form of paralysis in one arm, occurring in very young children, from injury to the fifth and sixth cervical nerves by forcible traction on the head and neck during delivery, or from pressure, when no interference with labor has been made. The muscles paralyzed are the deltoid, biceps, brachialis anticus, infraspinatus and supinator longus, and occasionally the extensors of the hand. The arm hangs by the side; it cannot be raised from the shoulder or flexed at the elbow, but the forearm and hand can be moved. In some cases the hand is flexed and rotated inward; there is anesthesia on the outer side of shoulder and arm (see Fig. 11).

In some of the cases of obstetric paralysis the nerves supplied to the brachial plexus from the seventh cervical and first dorsal roots are injured as well as those from the fifth

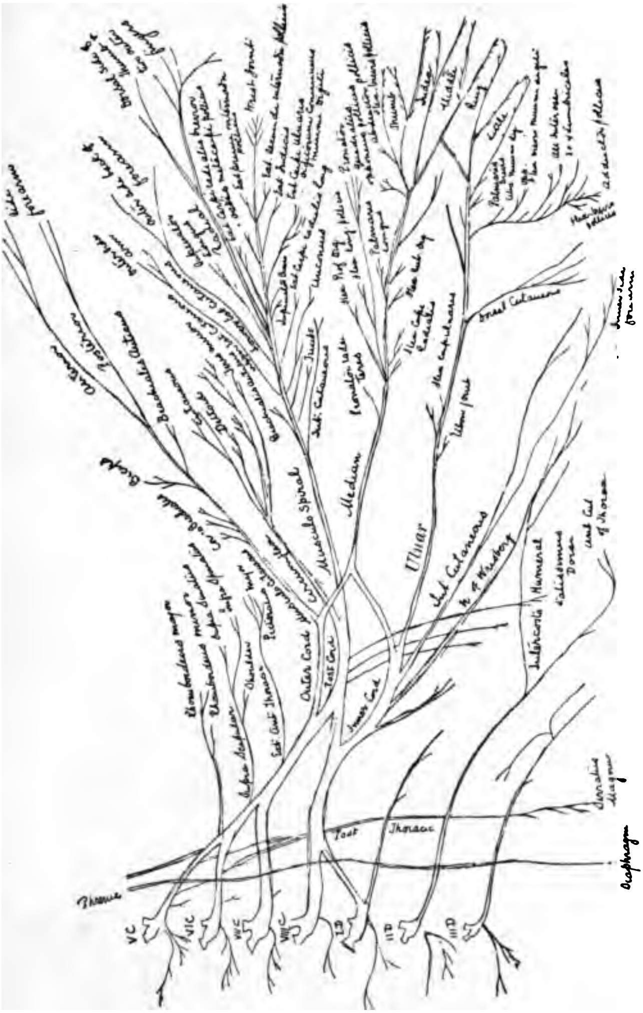

FIG. 11.—Brachial plexus.

and sixth cervical roots; the result is that the muscles of the entire upper extremity are paralyzed (see Fig. 12).

Erb considers the **prognosis** in these cases unfavorable; Starr has seen some of them recover spontaneously. Recovery has occurred in all those cases in which the paralysis is confined to the upper-arm muscles, while in those cases in which all the muscles of the extremity are paralyzed recovery has been slow.

Treatment consists of galvanism to the affected nerve and muscles and friction. Starr recommends keeping the elbow flexed, and not allowing the hand to hang down, to prevent overstretching of the shoulder ligaments.

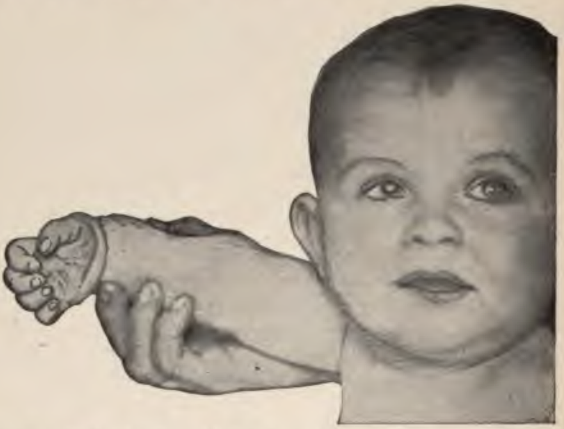

FIG. 12.—Brachial palsy from birth-injury, due to traction in axilla (Church).

Surgical treatment by nerve anastomosis offers some hope in the persistent cases (see Fig. 12).

Paralysis of the muscles supplied by the seventh cervical and first dorsal may occur from injury or disease of the nerves at their roots or in their course. This variety of paralysis is confined to the muscles of the hand and forearm, constituting the Klumpke paralysis type.

Paralysis of the laryngeal branches of the vagus may occur from injuries or compression of these nerves by

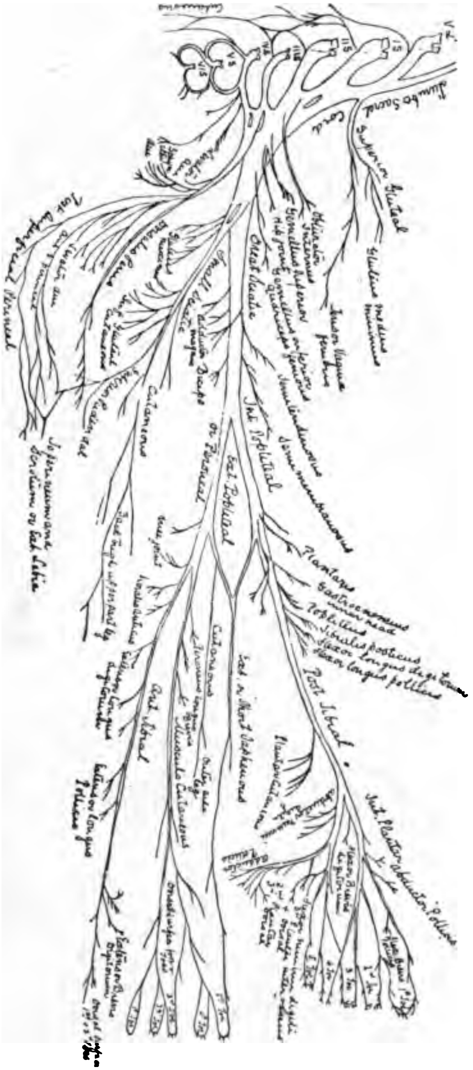

Fig. 13.—Sacral plexus.

tumors in the neck or mediastinum, by enlarged lymphatic glands, aneurysms in the arch of the aorta, carotid, and subclavian arteries. It is met with sometimes as a symptom in hysteria, in disseminated sclerosis, in bulbar paralysis, in locomotor ataxia, and as the result of lesions in the corpus striatum and its vicinity. (See Diseases of the Brain.)

Symptoms.—It may give rise to difficulty in breathing, difficulties in speech depending upon the muscles paralyzed; or there may be paroxysms of spasmodic coughing, as when the nerve is irritated by the pressure of tumors or aneurysms or as in locomotor ataxia (see that disease).

Paralysis of the lumbar and sacral plexus and its branches may arise from injuries, diseases of the vertebræ, tumors, abscesses, fracture of the thigh, etc. (see Fig. 13).

Paralysis of the anterior crural nerve causes inability to flex the thigh on the hip and extension of the leg. If sensory disorders are present, the anesthesia extends over the lower two-thirds of the thigh, the knee and inner side of the leg and foot.

If the obturator nerve is paralyzed, adduction of the thigh and crossing this leg over the other are impossible; outward rotation of the thigh is difficult. Anesthesia is on the inner side of the thigh as far as knee.

In paralysis of the musculocutaneous and anterior tibial the foot cannot be flexed, but hangs down; in walking the toes drag, and the person is in danger of tripping; to avoid this, the leg is lifted very high by flexion of the thigh on the hip and at knee. This is a condition frequently observed in infantile and other spinal paralyses. Sensory disorders, if present, are in the anterior and external part of the leg, dorsum of the foot, and toes.

In paralysis of the trunk of the sciatic all the muscles of the leg and foot are paralyzed. There may be all the trophic disorders described under injuries of nerves, and muscular atrophy may follow.

SECTION III.

DISEASES OF THE SPINAL CORD AND MEDULLA.

To present a complete nosology of spinal-cord lesions is an extremely difficult matter. The lesions are so apt to overlap, and it is only in the initial stages or in those rare instances in which one type of structure alone is affected that the simpler uncomplicated forms of spinal-cord affections are seen.

For purposes of diagnosis eight types of lesions may be differentiated, according to the anatomic involvement. These are:

1. The anterior horn motor nuclei group—muscular paralysis and atrophy syndrome.
2. Anterior horns and lateral column group—muscular atrophy and spasticity.
3. The posterior column group—sensory and ataxic syndrome.
4. Anterolateral column group—paretospasmodic; contractions and tremor syndrome.
5. Posterior and lateral column group—ataxia and spasticity syndromes.
6. Central posterior gray substance—vasomotor disturbances; dissociation.
7. The anterior and posterior horn; all the nuclei—vasomotor symptoms; muscular atrophy; dissociation; sensory syndrome.
8. Diffuse diseases of the spinal cord—myelitis; disseminated sclerosis.

To these a further group may be added of those cases in which there is secondary degeneration of the descending tracts from involvement of the cerebral substance.

CHAPTER I.

INVOLVEMENT OF MOTOR NUCLEI—ANTERIOR POLIOMYELITIS.

ANTERIOR poliomyelitis may be acute or chronic. The lesion may be limited to a few nervous structures, or it may involve the entire series in the cord and medulla, as in Landry's paralysis. Its situation may vary widely—a leg center; an arm center; speech center; oculomotor centers; any or all or portions of these may be involved in the process.

The classic type is that seen in children—the acute anterior poliomyelitis (acute paralysis) of infants and children.

INFANTILE SPINAL PARALYSIS (Acute Poliomyelitis Anterior).

Etiology.—It occurs in children during the first ten years of their life, but is most common from birth up to three years of age. Boys are more often affected than girls; but Gowers thinks this is only so in those cases which occur under two years of age. Sinkler, of Philadelphia, first pointed out that the disease was very much more frequent in summer than in winter, and that the largest number occur from May to September. Cold has always been assigned as a cause, but Sinkler's observations throw doubt upon this. The children are often apparently well when they are suddenly attacked; it may occur after diarrhea or some of the eruptive or malarial fevers. It seems pretty well established at the present time that this disease is due to a bacterial infection, and the pathologic lesions are the result of the poisoning of the cells by the toxins.

Symptoms.—The onset is usually sudden. As premonitory symptoms there may be some languor and irritability. There is usually more or less fever of short duration. The attack may be ushered in by a convulsion, or the child may be put to bed apparently quite well. It is restless during the night, and in the morning it is found to be paralyzed in some of its extremities. The lower extremities are most commonly affected. At first there is a great deal of sensitiveness about the paralyzed extremities; if they are handled, the child screams; this lasts a few hours or a few days, and subsides. After a week or so some of the paralyzed muscles may recover, leaving others permanently weakened (see Fig. 14).

The distribution of the paralysis is variable; the lower extremities are the most frequently affected—one or both legs; the upper extremities, the muscles of the neck and back, may be paralyzed; or it may be hemiplegic in distribution; but this is rare. There are no sensory disorders. Reflex action is lost in the paralyzed parts. There are no rectal or vesical disturbances. The parts which remain paralyzed soon show trophic disturbances. The muscles begin to atrophy, the parts are bluish and cold, the circulation is defective, and chilblains form easily. Whenever there is any undue pressure from a shoe or brace, sores form. The muscular atrophy becomes extreme in some cases; as a consequence, deformities arise. Talipes equinus and varus are the most common. These deformities are brought about by one of three causes, but most probably by a combination of some of these conditions: (1) It is believed by some that they are due to the predominant action of the healthy muscles; (2) Volkman believes it is due to the weight of the limb itself; (3) that the healthy muscles are constantly shortening, owing to the absence of the power of their antagonistic muscles.

As the child grows, the paralyzed limb does not develop in keeping with the healthy one—there is retarded development. The bones are shorter and smaller, so that when the child grows up, the paralyzed extremity is shorter and smaller than the others. The electric reactions for faradism are very much diminished or lost; the galvanic reaction varies from simple diminution to complete reaction of degeneration, or even entire absence of reaction.

Pathologic Anatomy.—Autopsies early in the course of the disease are not frequent. In such cases the anterior cornua corresponding to the affected parts are found very vascular, the capillaries are distended, and there are minute extravasations of blood in the gray substance; the ganglion-cells are swollen, granular, and their processes indistinct; various grades of acute parenchymatous disintegration are present. Chromatolysis and destruction of the ganglion-cells are present; there may be infiltration of leukocytes to a moderate degree. In autopsies made many years after the onset of the disease, the anterior horn is shrunken, the ganglion-cells are absent, the surrounding tissue is dense, and fibrous tissues predominate.

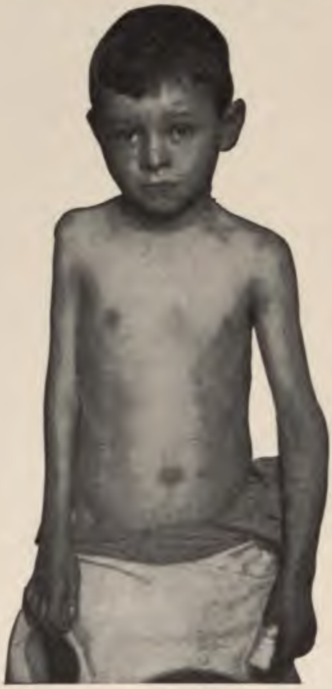

FIG. 14.—Deformity of upper extremity and thorax after poliomyelitis anterior acuta (Church).

Prognosis.—These children rarely die in the acute stage; death usually occurs years after, of some other disease. Improvement may take place in some of the paralyzed muscles after a number of weeks; this cannot be predicted. Occasionally complete or partial recovery occurs.

Treatment.—Tonics, cod-liver oil, attention to the diet, and general hygienic management, sponging with cold water, etc. For a long time galvanism has been used on these paralyzed muscles. If tried, it must be with the hope of keeping the paralyzed muscles from wasting, and improving the condition of the circulation and nutrition; but in this one will often be disappointed. Massage will be of service. Later, if deformities arise, the orthopedic surgeon will aid by dividing the tendons and placing the limbs in a comparatively useful position.

ACUTE AND SUBACUTE SPINAL PARALYSIS IN THE ADULT.

This may be acute or subacute in its onset; it has a very great resemblance to acute myelitis of the anterior horns in children; it is evidently the same disease, with some slight modifications in symptomatology. It is to be borne in mind that it is almost impossible to separate this condition from acute polyneuritis.

Etiology.—It occurs in adults; so far as is known, its cause is similar to that operating in children.

Symptoms.—The onset may be somewhat sudden. There may be some elevation of temperature, tingling and pricking sensations about the extremities, with a feeling of numbness; some aching in the back; and in from twenty-four to forty-eight hours paralysis, more or less great, comes on, or it may develop much more slowly. It most commonly affects all extremities, but in a proportion of cases it is confined to the lower extremities—paraplegic. Rarely the face, eyes, tongue, and muscles of deglutition are affected. There is in some cases a very slight impairment of tactile sensation at first, but it is not lasting. Other than this there are no true sensory disorders; there are no disturbances of the functions of the bladder and rectum; the paralyzed muscles may present fibrillary contractions, but this is observed only in the subacute cases. There is loss of faradic reaction and reaction of degeneration to galvanism. There may be some feeling of constriction about the body or limbs. There is quite a marked tendency for the paralyzed muscles to recover, and in a large proportion of the acute cases recovery is complete; but in those cases where all the muscles do not recover, muscular atrophy occurs and may become extreme, giving rise to contracture and deformities. The circulation is poor; the extremities are purplish and cold.

Prognosis.—The same as in children.

Diagnosis.—The more or less rapid onset of motor weakness without true sensory symptoms, the subsequent atrophy and deformities, absence of bladder and rectal disorders, disturbance in the electric reactions, etc.

Pathologic anatomy is similar to that of acute myelitis of the anterior horns in children.

Treatment must be such as is adopted in children.

ACUTE ASCENDING PARALYSIS (Landry's Paralysis).

Etiology.—It is supposed to follow exposure to damp and cold. It is known to follow typhus and typhoid fever, variola, and splenic fever. The most likely hypothesis is that of an acute infectious disease.

Symptoms.—There may be premonitory symptoms, such as aching and soreness, with tingling in the parts; headache and backache; or it may appear during the course or at the onset of some other disease. The first definite symptom is usually a weakness in both legs, which increases rapidly—sometimes in a few hours—to complete paralysis. It soon extends to the arms; as the lesion extends up to the medulla there occurs paralysis of the diaphragm and neck muscles. There is difficulty in swallowing and speaking, owing to paralysis of the muscles of speech and of deglutition. The extremities are flaccid and powerless; there is no muscular atrophy; there are no alterations in the electric reactions; the reflexes are lost; there are sensations of tingling, but no loss of tactile sensibility as a rule. There are no bladder or rectal symptoms; no bed-sores; the mind is not disturbed. It usually runs a rapid course of from three to ten days in death by arrest of respiration, owing to the implication of the medulla oblongata.

Pathology.—The changes in the spinal cord which give se to this rapidly increasing paralysis are not fully made out.

In many cases the lesions of neuritis are alone to be found; diseased nerves and healthy medulla, in others the ganglion-cells, have been found affected, and the peripheral portion of the motor neuron found intact. The pathologic picture may then be that of an acute neuritis or an acute poliomyelitis. The most recent researches all seem to bring into greater prominence the character of the medullary lesion.

Diagnosis.—The great rapidity with which the symptoms appear is characteristic. Acute ascending paralysis has some resemblance to the following diseases, but from which it is easily differentiated: Acute poliomyelitis anterior is often quite rapid in its development, and when all extremities are involved, it may present the general appearance of Landry's paralysis. In acute poliomyelitis anterior there is not the rapid involvement of the medulla which there is in this disease. The faradic reaction is lost in poliomyelitis and it is not in Landry's paralysis. Poliomyelitis is not a fatal disease. It can hardly be mistaken for spinal meningitis, in which the paralysis is not rapid in its development; the prodromal stage is much longer; and the most distinctive symptom is pain, often of great severity, in the muscles of the back and extremities, and radiating along the spinal nerves which are given off from that portion of the cord which is the seat of greatest inflammation. The disease ought not to be mistaken for polyneuritis even in its most rapid forms. The onset and progress of Landry's paralysis are always more rapid even than those cases of diphtheric paralysis which are sometimes generalized, and in which, as in Landry's paralysis, there are no sensory symptoms. In diphtheric paralysis the muscles about the throat and neck are affected very early—in fact, they are usually the first to show disease; it is the reverse in Landry's paralysis. In the other forms of polyneuritis the sensory symptoms are more decided and lasting. There is tenderness along the nerve-trunks, even in cases of acute infectious neuritis. It remains to be seen if there is not a lesion in the central nervous system, as well as in the peripheral nerves—in the so-called acute infectious neuritis. It must be remembered that in all probability changes in the spinal cord and peripheral nerves are present in those cases which we now think are of infectious origin.

Prognosis.—Unfavorable; it is a rapidly fatal disease. A few cases are reported as recovered.

Treatment.—Up to this time no treatment has been of much service.

Bibliography.—Bailey and Ewing, "A Contribution to the Study of Acute Ascending (Landry's) Paralysis," New York Medical Journal, July 4, 1896. A full list of publications up to this date will be found in this article. Déjérine and Thomas, Maladies de la Moelle, 1902.

CHRONIC MYELITIS OF THE ANTERIOR HORNS OF THE SPINAL CORD (Progressive Muscular Atrophy).

It attacks males oftener than females, not infrequently developing during convalescence from some acute disease, such as measles, acute rheumatism, typhoid fever, etc. It is thought to be caused by cold, excessive physical exertion, injuries, etc., but it often occurs without the possibility of assigning a cause—apparently as a degenerative process. Heredity is said by Schultze (Sachs) to be an important element in its causation.

Symptoms.—It begins slowly as a weakness, usually in the upper extremity, and more frequently in the right hand. There may be some aching in the hand. Soon the muscles of the hand begin to atrophy. At other times the symptoms come on less slowly, with aching in the muscles and pains; the disease progresses more rapidly, and the atrophy is more generalized. The atrophy extends from one muscle or one group to the other. In cases where the shoulder muscles are much wasted, the arms hang at the sides and the hands have a flattened, flabby appearance. In some cases the legs are involved in the disease, but the atrophy is never so marked as in the upper extremities. As the disease progresses the medulla may be involved, when there is, in addition, bulbar paralysis; the tongue is atrophied, presents a shriveled, shrunken appearance, the muscles of the face and of deglutition are weak, there is indistinctness in speaking, and later much difficulty in swallowing, owing to the paresis of the muscles of deglutition. In extreme cases much distress is caused by fluids passing up through the posterior nares and out of the nose (see Figs. 15, 16).

Fibrillary contractions are constant in these atrophied muscles, and especially in the tongue. The tendon-reflex is lost in all those cases in which the dorsolumbar cord is involved. The faradic and galvanic reactions may be simply diminished. There are no sensory disorders in this disease; no bladder or rectal disturbance; the parts are cold, and the circulation is impaired.

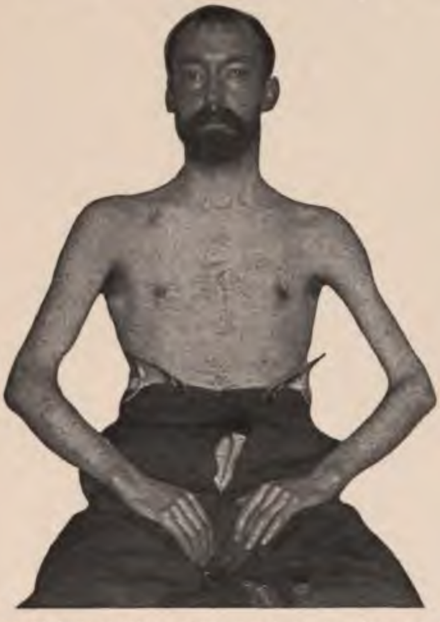

FIG. 15.—Scapulohumeral type of progressive muscular atrophy. Note the angle on right side of neck with lengthening of the neck, due to wasting of the trapezius, and the peculiarity of the deltoid (Church).

Pathologic Anatomy.—Atrophy, granular pigmentation, and disappearance of the ganglion-cells of the anterior horns. There are some thickening and change in the neuroglia, with dilatation of the blood-vessels. In fresh frozen sections of the cord granular corpuscles may be found. The anterior horns later become shrunken; the anterior roots are somewhat atrophied. The disease is believed to begin in the anterior horns and its large ganglion-cells; the anterior roots are diseased secondarily. The anterior horns, and more especially its ganglion-cells, are the trophic centers for the anterior roots, motor nerves, and muscles. The disease of the anterior roots and the muscular atrophy are in relation to the extent of the lesion in the anterior horn; the slow and gradual disease of the ganglion-cells explains the slowly progressing muscular atrophy, and as one portion after another of the spinal cord becomes affected, the muscles of which it is the trophic center waste.

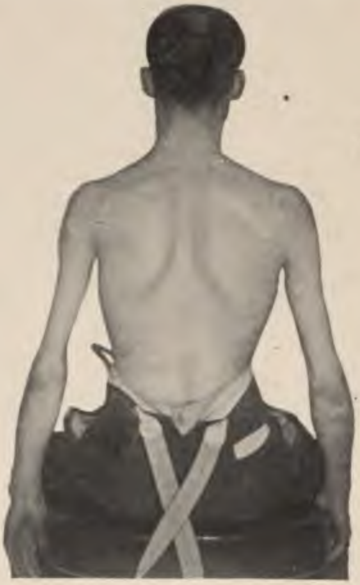

FIG. 16.—Scapulohumeral type of progressive muscular atrophy. Note the angle on right side of neck with lengthening of the neck, due to wasting of the trapezius, and the peculiarity of the deltoid (Church).

Prognosis.—Unfavorable. In some cases the progress of the disease is of many years' duration; in others it is more rapid—one, two, or three years; and if bulbar symptoms are added, death may occur sooner.

Treatment.—No treatment has exercised much influence over the progress of this disease. Tonics, cod-liver oil, and galvanism are indicated. Avoidance of the use of the muscles appears to have some influence in retarding the atrophy and prolonging the miserable existence of the person.

The Peroneal Form of Herbert Tooth.—This disease is described here, although at the present time its exact place in the two large groups of muscular atrophy is not certain, as no pathologic findings have shown if this be a disease depending upon a nervous or a muscular lesion; but there are many indications which justify its being placed, for the present at least, with the muscular atrophies of nervous origin. That it has an hereditary basis has been well established. It was first described by Charcot and Marie in 1886, and simultaneously by Herbert Tooth in England. It may begin from very early childhood to twenty years of age, and occasionally later. It begins simultaneously in both lower extremities as a progressive weakness and difficulty in using them; the muscles of the foot and leg begin to atrophy. It is a wasting of individual muscles and progresses slowly; sooner or later deformities arise due to paresis and atrophy of the muscles of the anterior tibial and peroneal groups. This atrophy may be confined to the lower extremities, or it may extend to the upper extremities, and there may be the deformity of the hand known as "main en griffe." The main feature is that the atrophy extends only from the knee or elbow peripherally. The thighs or arms are unaffected. There are no sensory rectal or vesical symptoms. The tendon-reflexes are present until a very late date. There are vasomotor disorders similar to those that are seen in acute poliomyelitis anterior. There may be partial or complete reaction of degeneration.

Prognosis.—The condition progresses slowly; death is caused by some intercurrent disease which may arise.

Treatment.—The same as that indicated for acute poliomyelitis anterior.

Bibliography.—Charcot and Marie, Rev. de Médicine, 1886; Herbert Tooth, Brain, 1888; and Thesis, 1886.

CHAPTER II.

DISEASE OF THE POSTERIOR COLUMNS.

Locomotor ataxia is the main representative of this type.

LOCOMOTOR ATAXIA.

Etiology.—It is most common between thirty and fifty years of age; it affects males oftener than females; a neuropathic constitution is the predisposing cause in all these cases. As exciting causes there are cold, damp, hardships of all kinds. It may follow some of the acute diseases; falls and injuries are said to act as exciting causes. Syphilis is a frequent cause—75 per cent. (Erb, Seguin) of the cases have a syphilitic history; the syphilitic poison causes disturbances of nutrition which lead to the degenerative changes of the lymphatics found in these cases.

Symptoms.—Lancinating, lightning-like pains, or boring in character, are very early symptoms and are frequently mistaken for rheumatism, which they do not resemble in any way; they do not follow the course of any nerve-trunk, but shoot about in the various cutaneous branches. The lower extremities are generally first affected. These pains come on with great severity in paroxysms lasting a few hours or a few days and subsiding. They may precede the other symptoms for years. There is numbness in the feet and hands and in places about the legs; the feet feel thick and heavy, and the patient may be unable to recognize the quality of the substances he walks on. Sensibility is retarded. The patella tendon-reflex is lost; the pupils are contracted, usually alike, but one may be larger than the other; there is loss of reaction to light and preservation of reaction to accommodation (Argyll-Robertson pupil). Diplopia or double vision may occur, owing to paralysis of a muscle of one eye; it often comes on very suddenly, lasts a variable time, and may pass away, to recur again. It has been known to occur and pass away four separate times in one case. The ophthalmoscope may show atrophy of the optic nerves. Slowness in micturition occurs very frequently; sometimes there is slight dribbling of the urine (see Fig. 17).

Ataxia.—Persons find it difficult to stand or walk in the dark; they sway and stagger about, and this difficulty is increased if they cannot see where they are to put the feet, or if they have to walk on a narrow space or through a narrow doorway, or turn about quickly. This uncertainty is very much increased by making them walk with the eyes shut. If they stand with the eyes shut, they reel about from side to side and are in danger of falling (Romberg symptom). They are unable to touch accurately and directly objects with the feet or hands if all extremities are involved in the disease,

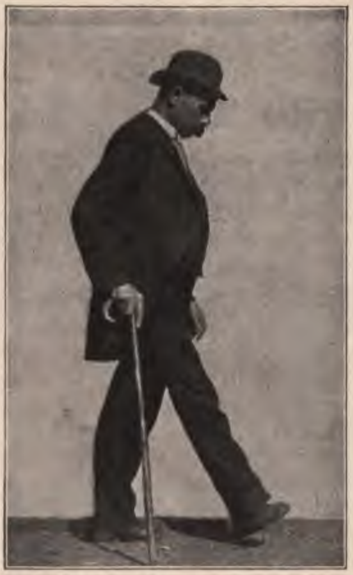

FIG. 17.—Gait in tabes. Observe overextension of supporting knee, rigidity of advancing leg, elevated toe, heavily descending heel, watchfulness of steps, and assistance by cane (Church).

especially if the eyes are shut. Attacks of vomiting—"gastric crises"—may occur, coming on suddenly, and lasting a few hours or a few days, and ceasing suddenly. There may also be nephritic crises simulating very closely nephritic colic; intense pain in the region of the kidney, with bloody urine; it ceases suddenly. They may also suffer what have been called "intestinal crises"; sudden attacks of looseness of the

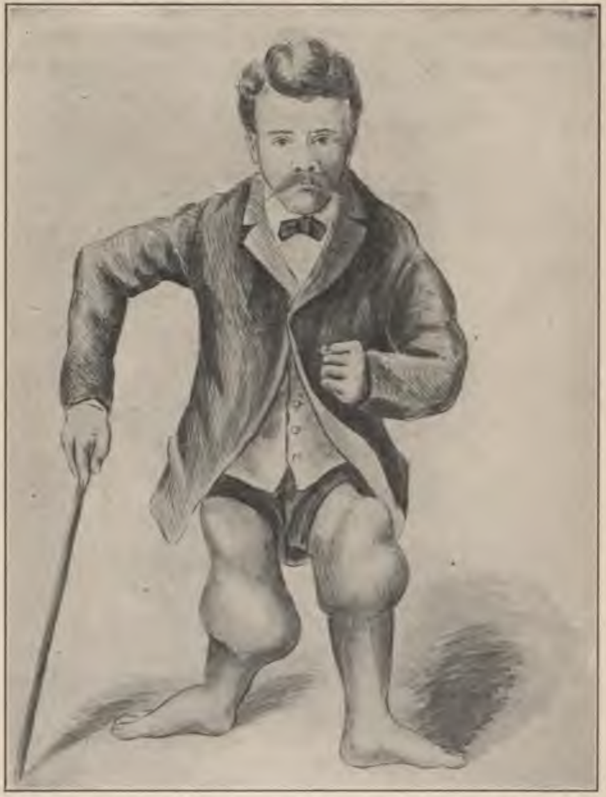

FIG. 18.—Arthropathy of both knees in a case of locomotor ataxia (Glorieux and Van Gehuchten, *Revue Neurologique*, September 15, 1895).

bowels; a kind of serous diarrhea, which also ceases suddenly. Laryngeal crises are also observed; sudden coughing seizures, with great difficulty in breathing; the face distressed and turgid; and the person appears in imminent danger of dying; it suddenly ceases. The suddenness of onset and of disappearance characterizes all these "crises." There may be permanent paralysis in one or more of the eye-muscles, and ptosis (paralysis of the levator palpebræ, so that the lid droops over the eyeball) may occur in one or both eyes. Paralysis of the anterior tibial group of muscles in one leg may occur, and may be passing or permanent. Muscular atrophy may occur in association with this disease, and it is usual in the lower extremities, but may also involve the upper; it may become extreme and give rise to contractures and deformities of the feet.

Apoplectiform seizures may occur in which the person is dazed, confused, and has difficulty in speaking; this is of temporary duration; it may be associated with hemiparesis (partial paralysis of one side of the body), or there may be a hemiparetic attack without the apoplectiform state. These hemiparetic attacks last a few hours or a few days, and pass away entirely. As trophic disorders, arthropathic disease of some of the large joints may occur. The joint becomes swollen and edematous without redness. There is usually very little or no pain. As the edema subsides dislocation may be discovered. Sometimes the joint remains permanently distended, but the eroded and absorbed heads of the bones can be felt (see Fig. 18).

The hip, knee, ankle, elbow, and shoulder are most frequently affected. Changes may take place in the long bones, so that they become very brittle, and spontaneous fractures may occur. These conditions are not very common. What has been called perforating ulcer of the foot may occur; it is usually in the great toe. Black and blue spots may occur under the skin or nails at the seat of severe lancinating pains or without; they are due to small hemorrhages. Deafness is observed in a few cases.

In a comparatively few cases mental symptoms occur; the memory becomes enfeebled; all the mental faculties are impaired; there is dementia. There may be some passing grandiose ideas, such as are found in general paralysis of the insane, but they are not usual; some passing delusions of persecution are more common; epileptiform seizures occur at this stage, and persons are liable to die in one of them. The duration of the disease is very variable. A great many persons will live ten or twelve years and even longer with it; others, and these are the exceptional cases, die in two or three years from convulsions; a rapid progress of the disease or a diffuse myelitis is set up, running a somewhat rapid course, or the person may die of some intercurrent disease, of which Bright's disease is the most common.

Pathology.—It has for some time been known that the anatomic lesion in this disease is in the posterior part of the cord. In recent years careful pathologic studies by Pierret, Westphal, Strümpell, Lissauer, Flechsig, Raymond, and others, and the embryologic studies of Flechsig and Bechterew, with the aid of improved technical methods, staining agents, etc., have added much to our information of the pathologic processes and their distribution, and have shown that the changes and the location of the lesion are not so simple as were heretofore believed. In an examination of sections from the spinal cord in an advanced stage of the disease the entire posterior columns in the fresh state will be found to present a grayish look. In hardened and mounted sections these columns may be found diseased in their entirety, but a study of a series of cases, the subjects of which have died early in the course of the disease, has shown that there is a pretty uniform localization of the beginning lesion in the column of Burdach. The changes in the columns, however, are probably in large part secondary to alterations in the posterior spinal ganglia, although primary syphilitic inflammation of the lymphatics of the spinal cord is an important factor (Figs. 19, 20).

Autopsies made at various periods of the disease have shown that, later, other parts are involved, but that there is no uniformity in the succession of the parts subsequently diseased. The entire column of Burdach becomes diseased; the columns of Goll; the posterior roots and nerves; the zones of Lissauer. Clarke's columns may be found diseased; in some cases the direct cerebellar tract. The cells in the posterior horns may be atrophied, and occasionally Gowers' column is found degenerated. Many of these changes are, of course, secondary, notably the disease in Goll's columns, the cerebellar tract, and Gowers' columns; they are of the nature of secondary degenerations. Involvement of the lymphatics is an all-important pathologic feature (Marie and Guillain).

Histologically, the changes in the posterior columns which have been called "sclerosis" are really of the nature of a degenerative process; they are characterized by a gradual disappearance of the nerve-tubes, sometimes evidences of irritation in the vessels and neuroglia, but no active process, as a rule. There is a small amount of granular material scattered among the diseased tissue; occasionally large numbers of amyloid bodies. In advanced cases, where the nerve-fibers have largely disappeared, there is retraction of the neuroglia tissue, and the posterior column looks smaller and flattened; some posterior spinal meningitis may be observed, but it is not always present. The posterior roots are atrophied. The disease begins in the dorsal region usually, and there may be atrophy of the cells in Clarke's columns, and to some extent of those in the posterior horns. The extent and exact distribution of the lesions vary very much in different cases after the early stages. Changes have been found

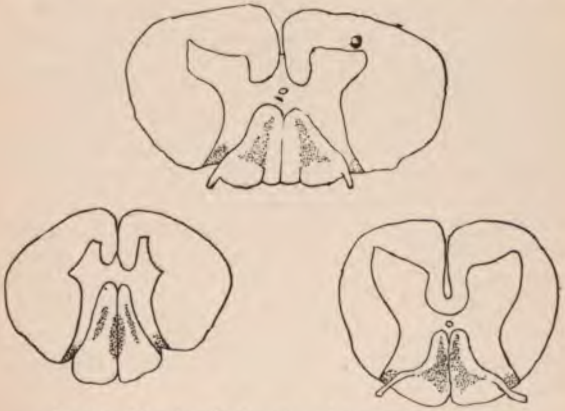

FIG. 19.—Showing the location of the beginning lesion.

in the peripheral nerves, but these are probably present only in the more advanced stages of the disease. These changes consist in breaking up of the myelin into irregular masses, which are scattered about the sheath of Schwann; there appears to be a tendency for this process of disintegration in the myelin to begin in the neighborhood of the constriction of Ranvier.

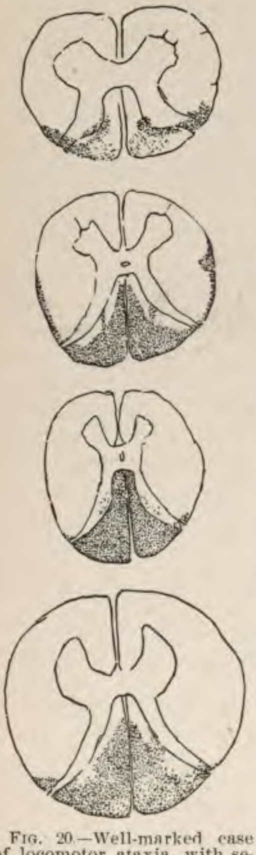

FIG. 20.—Well-marked case of locomotor ataxia, with severe lancinating pains. Shaded region shows diseased area (Davis).

Diagnosis.—Lancinating pains, ataxia, pupillary changes (described above), absent tendon-reflex, are sufficient to make the diagnosis.

Prognosis.—Unfavorable as to recovery; it is slowly progressive.

Treatment.—Iodid of potassium in some cases appears to help the condition, but it never cures, even those cases which have a clear syphilitic history. As internal remedies, perhaps Donovan's solution is as good as any. If the physical condition is poor, nutritious, easily digestible food with cod-liver oil. For the relief of symptoms, the lancinating pains are the most troublesome. Acetanilid in 10-grain doses when the pains begin will often give relief (phenacetin and antipyrin are not nearly so efficacious); it should not be repeated too frequently. There are cases in which this dose will fail to give relief,—in fact, any dose which is safe,—and nothing but a hypodermic of morphin will allay the excruciating pains. Very recently suspension with Sayre's apparatus (for putting on the plaster-jacket) and modifications have been used; in some cases it gives relief to many of the symptoms—

among them, the pain, ataxia, and bladder symptoms; in others it does not appear to be at all beneficial. In making application of the suspension apparatus, care should be taken to learn if there are contraindications to its use; heart disease, serious disease of the blood-vessels, and great weakness are the chief ones. The suspension should be very slow and cautious. On the least evidence of ill effect the person should be lowered. It should not be continued more than half a minute the first time, and gradually increased to two or three minutes if it is borne well; it can be practised every other day. Belladonna often gives relief to the dribbling and involuntary discharge of urine. Overwork of all kinds and sexual and alcoholic excesses should be carefully avoided. Only a moderate amount of walking should be done. Cold and damp should be avoided. A residence, temporarily at least, in a dry elevated climate, with freedom from work and worry, often gives improvement. Suspension has not proved as beneficial as was expected. The reëducation of the muscles by gymnastic exercises of a special character, as has been suggested by Fränkel, is of benefit in two ways: by exercise of the muscles and by giving confidence to the person. It is of advantage only to those patients in whom coördination is very much impaired.

Bibliography.—J. C. Shaw, "Degeneration of the Peripheral Nerves in Locomotor Ataxia," Journal Nervous and Mental Disease, 1888; Déjérine and Thomas, Maladies de la Moelle, 1902; Fränkel, Tabetic Exercises, Blakiston, 1902; Marie and Guillain, Revue Neurologique, Jan., 1903.

CHAPTER III.

DISEASES OF THE ANTEROLATERAL COLUMNS.

In the purer forms of the syndrome consecutive to disease of the lateral columns contractures, paresis with exaggeration of the tendon-reflexes, clonus, the Babinski reflex, and tremor are the main symptoms.

The main disease types exhibiting these phenomena are the late contractures of hemiplegia—spastic spinal paralysis (lateral sclerosis) and Little's disease. The symptoms may also be found in part or entirely in disseminated sclerosis diffuse myelitis, or general paresis.

LATERAL SCLEROSIS (Spastic Spinal Paralysis; Spastic Paraplegia; Tabes Dorsalis Spasmodique; Primary Sclerosis of the Lateral Columns; Tetanoid Paraplegia).

This condition was first described by Dr. E. C. Seguin in 1873, by Erb in 1875, and by Charcot in 1876.

Etiology.—Heredity is said to play a part in its causation; it is very probably secondary to other pathologic conditions.

Symptoms.—It begins as a weakness in the lower extremities; the legs tire easily, and if long walks are attempted, they tremble, give way, and feel heavy; the feet are not lifted from the ground as they are normally in walking, but shuffled along, and in the advanced condition they scrape along the floor; the knees are slightly bent; the legs present a rigid appearance; in motion they have lost the suppleness and flexibility at the joints observed in health; when the person sits down and arises again, it is found that the muscles are very stiff, and it is with some difficulty that he arises; it is soon observed that the legs tremble, especially if the muscles are put on the stretch, as in any awkward position which the legs may be placed in. There may be spasm in the legs, especially at night; there may be some aching in the spinal column. If the legs are examined, they are found to be more or less rigid nd resisting, owing to muscular contraction; the muscular power is good—only a slight weakness. The reflexes are very much exaggerated, and the so-called foot phenomenon or ankle-clonus is marked. This is elicited by having the person press the tip of the toe against the rung of a chair, pressing hard against it, or by taking the foot in your own hand, and flexing it forcibly and quickly against the leg, at the same time making slight pressure above the knee to keep the leg steady. There are no sensory symptoms; no vesical or rectal disorders; no muscular atrophy; no trophic disorders. The disease progresses very slowly; it is often confined entirely to the lower extremities, but may involve the upper as well. Some cases of spastic paraplegia have been described in children, but these cases are possibly due to some cerebral disease of which descending degeneration is the result, and should be kept apart from the condition here described.

Pathologic Anatomy.—A primary sclerosis of the lateral columns if such a condition exists without lesion in other portions of the central nervous system. We have very little knowledge of primary lateral sclerosis; in combination with lesions in other portions of the spinal cord more is known. (See Combined Sclerosis, Friedreich's Disease, Lateral Amyotrophic Sclerosis, etc.)

Diagnosis.—The exaggerated reflexes; the muscular spasm; and the consequent spastic walk; the gradual onset of the symptoms and their slow progress; the absence of symptoms indicating a localized transverse lesion; the absence of sensory symptoms, of bladder and rectal disorders and trophic disturbances, and the appearance of the disease between thirty and fifty years of age.

Prognosis.—Unfavorable as to ultimate recovery; those suffering from it may live a great many years and it may be confined entirely to the legs.

Treatment.—Medication is useless unless the general health is impaired. Massage, cold sponging, electric treatment of a mild kind.

LITTLE'S DISEASE.

This is frequently described as a congenital form of the former affection, and is due to a defective development of the pyramidal tracts. Heredity plays some part in the etiology.

CHAPTER IV.

LESION OF THE POSTEROLATERAL COLUMN —THE COMBINED SCLEROSES.

COMBINED SCLEROSES.

UNDER the general designation of combined scleroses have been classed a number of conditions whose symptomatology and even pathologic anatomy are not fully made out.

Friedreich's disease and ataxic paraplegia are types as far as the pathologic anatomy is concerned.

ATAXIC PARAPLEGIA.

Etiology.—Heredity, syphilis, excessive physical labor, exposure, alcoholic and venereal excesses; it occurs also in elderly persons who have been subject to much privation and anxiety (Fig. 21).

Symptoms.—It begins usually very slowly, by stiffness and trembling in the lower extremities, with soreness and aching. Early the sexual vigor is lost; there is gradually developed marked motor weakness; there may be a feeling of numbness in the legs; occasionally lightning-like pains are present, but they are not, as a rule, present.

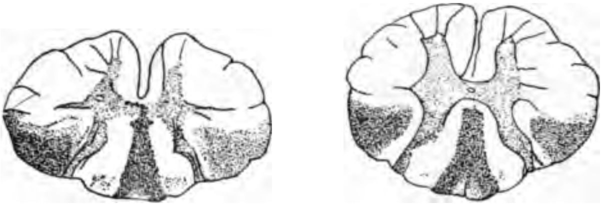

FIG. 21.—Ataxic paraplegia. Shaded regions indicate the disease in the white matter.

Ataxia is always present, as shown by incoördinate movements in walking or standing with eyes shut, etc. The gait is a mixture of locomotor ataxia and spastic paralysis. There may be dribbling or slowness of urination. The reflexes are exaggerated. The symptoms are often confined to the lower extremities, but the upper may be affected. As complications there may be mental disease somewhat similar to that observed in locomotor ataxia.

Pathologic Anatomy.—The lesion is a sclerosis of the lateral and posterior columns, and the clinical picture will vary according to the grade of involvement of each system. If the lesion is mainly that of tabes, so will the symptoms be, and vice versâ.

Diagnosis.—The slow progress of the disease, the association of ataxia, paresis, exaggerated reflexes.

Prognosis.—It is a slowly progressive disease; there is slight tendency for it to cause death.

Treatment must be the same as recommended in locomotor ataxia, Friedreich's disease, etc.

FRIEDREICH'S DISEASE (Hereditary Ataxia).

This disease was first described by Friedreich in 1861. It develops in children at an early age, as the result probably of hereditary influences, and it usually affects several children in the same family, but isolated cases are not infrequent. It occasionally develops as the individual grows up. There may be a neurotic family history; the sexes are about equally affected.

Symptoms.—It is first shown by an unsteadiness in walking; the child is awkward—falls easily and frequently; as the disease advances the upper extremities are affected; they become like the legs; the person's movements are disorderly. This increases; soon difficulty in speech is observed: it is slow and hesitating, and can become quite unintelligible, owing to the disorderly movement of the muscles. Nystagmus is not infrequent. Headache and vertigo are common. The tendon-reflex is lost in most of the cases, but it may be present and even exaggerated in some cases. Spinal curvatures may be present. Less common symptoms may be spasms, tremors, decreased electric excitability, polyuria, glycosuria, and vasomotor disturbances, flushing, profuse sweating, etc. There may be pains, but they are not lightning-like, but dull, and may be severe, located in one spot for a long time; as a rule, sensibility is normal, but there may be slight anesthesia. Contractures may occur in the lower extremities (Fig. 22). There are no pupillary changes.

Diagnosis.—From locomotor ataxia: Friedreich's disease begins usually in very young children; only rarely the first symptoms appear at an age when locomotor ataxia is common. There is absence of pains, of marked sensory symptoms, of bladder disturbances, of diplopia, and "crises" of abdominal symptoms, constriction in hypogastric region, of arthropathies. The very slow evolution of Friedreich's disease.

From disseminated sclerosis, with which it is most likely to be confounded: There is no tendency in disseminated sclerosis to occur in several members of a family. The disordered movements are more jerky and slow and the disorder of speaking is different—more slow and drawling, hesitating than in Friedreich's disease. There is a tendency to convulsions in disseminated sclerosis, and the gait is spastic.

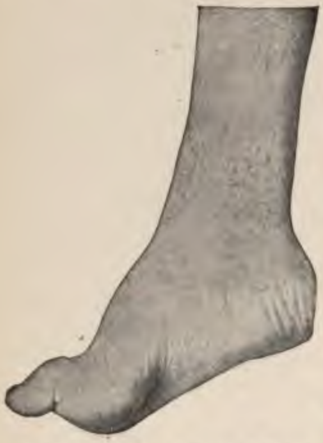

FIG. 22.—Clubbed foot of Friedreich's disease, showing shortened arch and retracted great toe (Church).

Pathologic Anatomy.—It has been found that the spinal cord is smaller than the normal in all these cases. There appears to be a defect in its development. The result is that sooner or later it undergoes a premature pathologic process, and this takes place in the posterior and lateral columns. The extent to which these columns have been found diseased varies somewhat, as the accompanying illustrations will indicate.

Histologically, some authors have described posterior spinal meningitis, but in the majority of these cases it has not been found; the gray degeneration of the posterior columns has been constant, atrophy, and disappearance of the nerve-fibers, with some thickening of the neuroglia, flattening of the cord from before backward. Degeneration of Clarke's columns and of the cerebellar tract and atrophy of the posterior roots have been found (Fig. 23).

Bibliography.—W. A. Hammond, Journal Nervous and Mental Disease, 1882. Dr. W. Everett Smith, Boston Medical and Surgical Journal, 1885. E. C. Seguin, New York Medical Record, 1885. Sinkler, Medical News, Philadelphia, 1885. Morton Prince, Boston Medical and Surgical Journal, 1885. Judson Bury, Brain, 1886. C. L. Dana, New York Medical Record, 1887. Ormerod, Brain, 1888. J. F. C. Griffith, American Journal Medical Sciences, 1888. W. Everett Smith, Boston Medical and Surgical Journal, 1888. Ladam, Brain, 1890. Déjérine and Thomas, Maladies de la Moelle, 1902.

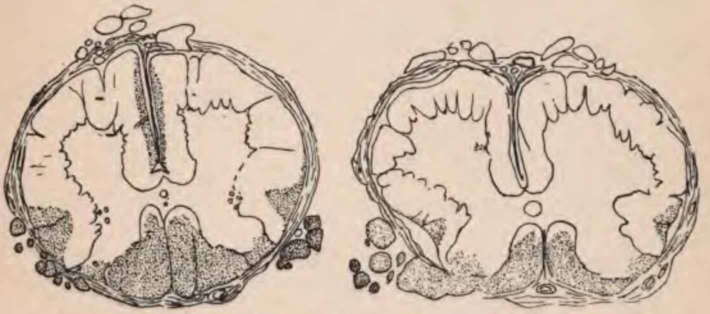

FIG. 23.—Showing the changes in the posterior and lateral columns (shaded regions) of the spinal cord (drawn from illustrations by Dr. W. E. Smith, *Boston Medical and Surgical Journal*, 1885).

CHAPTER V.

LESION OF THE ANTERIOR HORNS AND OF THE LATERAL TRACTS.

AMYOTROPHIC LATERAL SCLEROSIS (Spastic Muscular Atrophy; Charcot's Disease).

THIS was for a long time confounded with progressive muscular atrophy until Professor Charcot pointed out the distinctive features.

Etiology.—It occurs chiefly between thirty and fifty years of age; men are most frequently affected. Very little is known as to its causation.

Symptoms.—It usually begins in the upper extremities, but almost simultaneously in the lower; the majority of the cases show early symptoms of medullary disease, as a difficulty in speaking. There is a certain amount of weakness in the members; even at this early stage the muscles are somewhat wasted; it is not in individual or groups of mus-

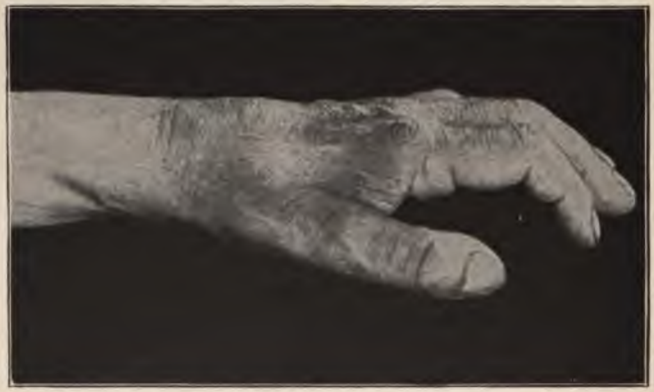

FIG. 24.—Hand in advanced case of amyotrophic lateral sclerosis, showing muscular wasting and the characteristic ape position of thumb (Church).

cles, as in the common type of progressive muscular atrophy, but is a more or less general wasting—an atrophy *en masse*, as Professor Charcot says. This muscular wasting extends rapidly to the shoulders, neck, and chest, with paresis, out of all proportion to the muscular wasting. Soon the lower extremities show evidence of atrophy, but it is never so marked as in the upper extremities. The walk is spastic and stiff; the feet are not lifted from the ground, but dragged and shuffled along; the toes scrape the ground; the knees are stiff, and the muscles rigid. As the disease progresses the extremities become quite useless and stiff; contracture is more or less marked,—in some cases it is very slight, indeed,—and when the muscular atrophy is extreme, may disappear entirely. The reflexes everywhere are exaggerated. As the disease progresses the medulla becomes more involved, and all the symptoms of bulbar paralysis become marked; paresis of the muscles of the face and deglutition, atrophy of the tongue, difficulty in speaking and swallowing, and in the advanced stages there is great danger of food passing into the trachea. There are few sensory disorders or rectal or vesical disturbances in this disease, save in the later stages (Fig. 24).

Prognosis.—Unfavorable. Death takes place within two or three years after the onset of the disease from paralysis of the respiratory center or from exhaustion due to the inability to take sufficient food, and from difficulties of respiration consequent upon the atrophy of the respiratory muscles and the accumulation of mucus in the lungs.

Diagnosis.—The association of motor weakness with muscular atrophy and exaggerated reflexes; the early appearance of bulbar symptoms; the absence of sensory, bladder, and rectal disorders.

Pathology.—The lesion is almost always strictly confined to the anterior horns and the lateral columns. In the anterior horns the changes are similar to those found in progressive muscular atrophy—gradual wasting, pigmentation, and absorption of the large ganglion-cells; sclerosis in the lateral columns.

Bibliography.—Charcot, Diseases of the Nervous System. J. C. Shaw, Journal Nervous and Mental Disease, 1879.

Beevor, Brain, 1882 and 1886. Ormerod, *ibid.*, 1886. Sacki and Schmaus, Pathologische Anatomie des Rückenmarks, 1901.

CHAPTER VI.

LESIONS OF THE CENTRAL GRAY SUBSTANCE.

SYRINGOMYELIA.

For a long time it had been observed at autopsies that there were in some cases cavities in the spinal cord, but the fact was known only as a pathologic curiosity. Olivier, in 1827, first used the name syringomyelia; he did not believe in a central canal in the spinal cord, and looked upon these cavities as an arrest of development. Later it was clearly proved that there was a central canal in the spinal cord. Soon observations were recorded of an abnormal dilatation of the central canal, and they were looked upon as arrests of development and described under the name of hydromyelia. Hollopeau, later, studied conditions somewhat analogous, under the name *diffuse peri-ependymal sclerosis.* In 1869 Grimm showed that the old syringomyelia, hydromyelia, and peri-ependymal myelitis was really due to destructive lesions in the center of the cord. This view was adopted by Simon, Westphal, and Leyden, but later the work of Schultze (1882) and Kahler (1881) showed that this pathologic lesion was associated with a certain grouping of symptoms. A large number of observers have added to the subject since.

Little is known as to its causation. The disease affects men oftener than women.

Symptoms.—There is great diversity in the way in which the symptoms begin: weakness in the hands or arms or a sensation of numbness may be felt. Muscular atrophy is added to the weakness; it is of the type of progressive muscular atrophy (see that disease); it may begin in one hand or in both. There are loss of sensibility to pain and thermoanesthesia: the person is unable to detect the difference between heat and cold on a more or less extensive area of the body; sometimes the person is not aware of this, and only an examination reveals it. Occasionally the patient finds that he has burns and injuries and does not know when he received them. This dissociation is very characteristic. Tactile sensibility and the muscular sense are often unimpaired, but they may both be diminished and even lost. Sometimes the patient complains of pains, tinglings about the extremities, joints, and back, with headache. The reflexes may be either abolished or exaggerated. Scoliosis is spoken of as almost a constant symptom, and it is seated, according to Blocq, in the dorso-lumbar region with the convexity to the right. Trophic disorders are quite common. The muscular atrophy usually shows first in the hands and extends afterward to other parts; it may begin in the shoulder muscles or in the lower extremities. Westphal, Schultze, and Grasset have each observed a case with facial paralysis. There may be fibrillary twitchings in the muscles. Electric excitability is usually diminished. The skin is often affected with herpetic and eczematous eruptions, and an atrophy of the skin called "glossy skin" has been described. The nails are very apt to become cracked, furrowed, and thick; there may be an edematous condition of the cellular tissue. The parts may be cold and cyanosed from defective circulation; slight irritation may cause persistent redness; the fingers may be swollen and red. The joints are sometimes the seat of arthropathies. The bones are thickened and often become brittle (Déjérine).

The numbness, analgesia, disorder of temperature-sense, and pains are found in the areas of the body whose nerve-supply is from the spinal-cord segments involved in the disease. In the last few years numerous contributions to this subject have shown that the symptomatology may be very complex in its arrangement. The disease may present the general grouping of symptoms found in amyotrophic lateral sclerosis, plus the sensory and trophic disorders described above. In other cases there are tabetic symptoms. There is ataxia in the upper or lower extremities, or in both, in addition to the other characteristic symptoms of syringomyelia. This tabetic form must not be confounded with cases in which true tabes and syringomyelia are associated. There are also cases in which the medulla oblongata is involved, and there are what are known as bulbar symptoms; these are due to the implication of the cranial nerves and their nuclei in the floor of the fourth ventricle. There may be inequality of the pupils, paralysis of the sixth nerve, diplopia, nystagmus, Argyll-Robertson pupil, which is found so commonly in locomotor ataxia, hemiatrophy of the tongue, paresis, and atrophy of the vocal cord. One or more of these symptoms may be present with the disorders of sensation in the face. These bulbar symptoms are usually a late manifestation in the disease, but they have occasionally been observed at its onset. In such cases there have been apoplectiform seizures at the beginning. There is a special predilection for the cervical portion of the spinal cord in this disease; hence the fact that the upper extremities are generally the seat of the first symptoms. If the disease process extends upward into the medulla oblongata, then we have added the bulbar symptoms. The disease always extends downward into the dorsal region for some distance, but, as a rule, does not involve the lumbar portion of the cord. The arthropathies, which are not infrequent in this disease, are most commonly found in the upper extremities, whereas in locomotor ataxia, in which arthropathies also occur, they are most common in the lower

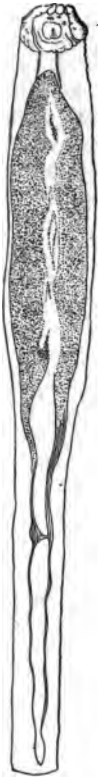

FIG. 25.—Showing the location and extent of the gliomatous tumor of the cord and cavity (after Ira Van Gieson).

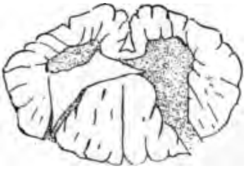

FIG. 26.—Cavity in the gray matter. Syringomyelia.

extremities. This disease may run a very slow course, lasting ten or twenty years from its first manifestations; or it may be rapid, the person dying in one or two years from implication of the medulla. Many cases have been reported in which the disease has appeared in quite young persons, and in whom there have been evidences of defects in development. These cases have been called congenital. It is believed, with much foundation, that there was an original defect in the cord, and that the changes in these cases are teratologic (Fig. 27).

Diagnosis.—Thermo-anesthesia with preservation of tactile sensibility. Trophic disorders, such as panaris, arthropathies, muscular atrophy, etc. There may be complete analgesia. Dissociation of sensibility may be occasionally observed in other diseases.

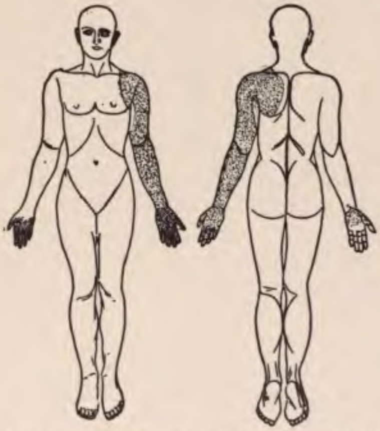

FIG. 27.—Areas of analgesia in syringomyelia (Jelliffe).

Pathologic Anatomy.—Cavities more or less large, situated generally in the posterior portions of the cord, but often encroaching upon the other parts; they are usually of irregular shape and may extend throughout the entire cord; these cavities are the result of a pathologic change in the cord. There is a development of a glioma or gliosarcoma, starting either in the epithelial lining of the central canal or in the gray substance of the posterior horn or the gelatinous substance; the tumor develops in the posterior part of the cord and gradually increases; later, the central portion of the tumor breaks down and a cavity is formed; this may break into the central canal if it did not start originally there; all below the tumor the central canal is dilated by edematous distention. The cavity is lined by a tissue somewhat loosely arranged, with numerous spider-cells and glia-cells.

There is still a diversity of opinion as to the causation of the pathologic processes. It appears that there are a variety of ways in which these cavities are produced, and the histologic changes are not always the same (Figs. 25, 26).

MORVAN'S DISEASE.

There is now little doubt that this disease is a variety of syringomyelia. The disease was first described by Dr. Morvan, a physician of Bretagne, France, in 1883; later by Prouff, also a physician of Bretagne; by Charcot, and others.

It is characterized by neuralgia-like pains in the arms and hands, followed by panaris, analgesia, anesthesia, paresis, muscular atrophy, trophic disorders, and subsequent deformity of the parts, more or less marked.

Its evolution is exceedingly slow—ten, fifteen, twenty, or more years. It appears, up to this time, to have been observed principally in Bretagne, but isolated cases have been observed in other places. It occurs at all ages from twelve to sixty years of age. Men are oftener affected than women.

Symptoms.—Neuralgia-like pains in the fingers and hands are among the earliest to appear. These are followed by panaris, which affects one or more fingers, and which may later appear on the others; it is usually associated with analgesia, but exceptionally it is absent, and these ulcerations are painful. Panaris begins with redness, heat, and swelling; it is very often extensive, involving not only the skin, but the subcutaneous tissue and the deeper parts, even the tendons, and there may be necrosis of the bones and destruction of the phalanges, from which there often result deformities of the hands. The lower extremities are rarely affected. Several of the fingers, sometimes nearly all of them, are the seat of these ulcerations. A long period of time may elapse between the involvement of each finger—from several months to several years. There are cases in which the panaris is painful, but in the majority of cases it is not; there is complete analgesia. Professor Charcot has pointed out that the first ulcerations may be painful, while the subsequent ones are not. Besides this, there may be cracks and indolent ulcerations in the folds of the skin. The nails become deformed and may fall out, adding to the deformities (Fig. 28). The hands are of a bluish color, owing to defects in the circulation. Broca has called attention to scoliosis of the vertebral column, and this has been observed in half the cases. Prouff has pointed

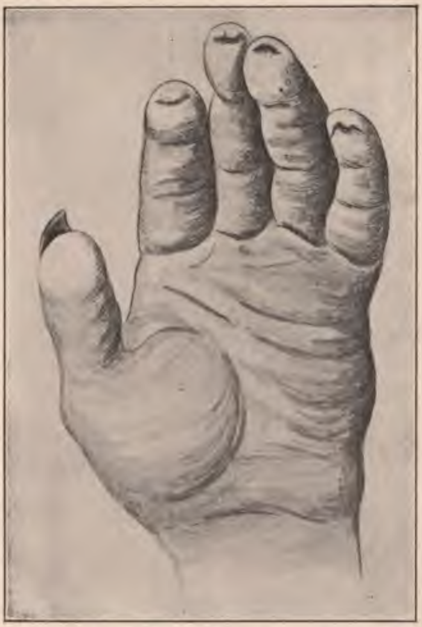

FIG. 28.—Showing the deformities of the hand from trophic disorders in Morvan's disease, from an illustration by Charcot (*Le Prog. Méd.*, 1890).

out the presence of arthropathies of the joints, having the appearance of arthritis sicca.

The analgesia, which is marked and constant, is confined to the upper extremities, and explains the absence of pain in these ulcerated fingers. With this analgesia there is also anesthesia; the tactile and temperature sense is much impaired or abolished.

Bibliography.—Westphal, Brain, 1883. Roth, Archives de Neurologie, 1889. Starr, American Journal Medical Sciences, 1888. Van Gieson, Journal Nervous and Mental Disease, 1889. J. C. Shaw, New York Medical Journal, 1890. Blocq, Brain, 1890. James Hendrie Lloyd, University Medical Magazine, March, 1893. Sinkler, International Clinics, vol. iii., 1893. Turner and Mackintosh, Brain, 1896. Starr, Journal Nervous and Mental Disease, January, 1897. Schlesinger, Die Syringomyelie (monograph). Hinsdale, Syringomyelia (monograph). A full bibliography will be found in these two works.

CHAPTER VII.

DIFFUSE DISEASES OF THE CORD.

MYELITIS (Inflammation of the Spinal Cord, Acute, Subacute, and Chronic).

ACUTE, subacute, and chronic have reference only to the length of time the symptoms are in developing; it is a more or less active inflammatory process. It may involve only portions of the cord; to a certain extent functionally distinct tracts; systematized lesions, as in acute myelitis of the anterior horns; or it may be more or less diffuse, involving gray and white matter without regard to regions. It sometimes affects the cord throughout transversely, involving white and gray matter for a limited distance vertically—transverse myelitis; at other times it may affect large portions of the cord—diffuse myelitis. Inflammation of the cord occurs under a number of circumstances; in all cases of compression of the cord—compression myelitis—but, as it has some features of its own, it is treated separately. It occurs as a somewhat chronic process in disseminated sclerosis. It may be set up at any time in a spinal cord the seat of the degenerative diseases—locomotor ataxia, for instance.

Etiology.—It is said to be caused by cold, damp, and exposure, overexertion, falls, concussion, syphilis; after typhoid, variola, and other diseases which impair the vitality of the system. It follows puerperal diseases and the puerperal state, poisoning by lead, arsenic, tuberculosis, or other toxic agents or infectious diseases.

Symptoms.—The symptoms vary according to the extent of the lesion. Weakness, which may begin in one leg and extend to the other, causing difficulty in walking, pain in the back, numbness in legs, tingling, pricking at times; the limbs may tremble, and there may be some passing cramps in the muscles. These symptoms progress until the person becomes helpless and is confined to bed; the legs become weaker until they cannot be moved. If the disease progresses, the bladder becomes involved. At first there may be retention of urine; later, it dribbles away, and the bowels may act involuntarily; the numbness increases to anesthesia, more or less great, according to the severity and extent of the inflammation; a band-like feeling is felt across the body: if at first low down, at or below the umbilicus. As the inflammation extends upward, the girdle sensation goes higher and higher, and it will be found that the anesthesia follows pretty closely after it. This band-like sensation indicates the line of the inflammation; all the parts of the body below are more or less anesthetic and paralyzed. Trophic disorders begin to appear; bullæ form on the feet and toes; cystitis is set up; the urine becomes ammoniacal and is loaded with mucus; the unfortunate person aches unless the anesthesia is great, which it only rarely is; bed-sores form, and in men the penis may slough. The facial expression is pale, anxious, and distressed. There may be some elevation of temperature. As the disease extends upward the respiration is involved, and death occurs by accumulation of mucus in the throat and lungs and involvement of the medulla. A case with these clinical features may run a course of six months or more before death occurs; others die in two or three months. The middle and lower dorsal region is the most frequent seat of this disease. The seat of the myelitis will somewhat modify the symptoms; its location can be fairly accurately determined by a study of the symptoms in each case: the motor disturbances; the sensory; the reflexes, etc., with the aid of the diagram of the spinal cord in its relation to the vertebral column, and the table of Starr.

Diagnosis.—The somewhat rapid onset of the symptoms as a motor weakness, associated with the decided sensory symptoms, anesthesia, if the disease progresses, the appearance of bed-sores, fever, often moderate, paralysis of bladder, etc.

Prognosis.—In the severe cases with rapidly progressing symptoms, unfavorable, as a rule; some cases of transverse myelitis recover. I have seen them recover when there were decided anesthesia and almost complete paralysis.

Treatment.—Ergot often appears to be of service. Cupping is useful. If there is reason for thinking the disease is due to syphilis, iodid of potassium. The urine should be drawn off, and if there is a tendency to cystitis, the bladder should be washed out every day with a solution of boric acid.

The bed-sores can be treated according to Brown-Séquard's method of alternate applications of heat and cold—ice and hot poultices. One of the best applications, if not the best, for these bed-sores is a mixture of aristol in balsam of Peru and absorbent cotton over it. The person should be kept clean, and pressure on the paralyzed parts prevented as much as possible; a water- or air-bed may be found necessary.

Compression Myelitis.—This occurs from pressure on the spinal cord by fractures of the spine, caries of the spine, tumors of the spine, or tumors developed within the spinal canal.

The onset of the symptoms may be either sudden or gradual, according to the cause of compression. In fracture it is sudden, as a rule; in tumors and caries, gradual.

Symptoms.—There is a grouping of symptoms common to these cases of compression. Paralysis is more or less complete in all the parts below the seat of disease. There is irritation at the seat of disease, as shown by pains, constant or darting, along the course of the nerves in the immediate neighborhood of the compression. Cramps in the muscles supplied by these nerves occur, and there may be anesthesia in their course if the pressure is sufficiently great to injure them. If the pressure is very great, so as to compress the cord very much or cut it across, then anesthesia may be more or less complete in all the parts below; the functions of the bladder are disturbed; the urine must be drawn off—it dribbles away. There are pain and aching in the hips and legs. Trophic disorders soon appear. If the compression is decided and sudden, the symptoms develop rapidly. If the cause of compression is slowly operative, they come on later and progressively. They consist in the formation of bullæ and ulcerations on the paralyzed extremities and bed-sores with cystitis. If the disease is in the middorsal region, what has been called "spinal epilepsy" occurs. It is a spasmodic twitching of the lower extremities; muscular wasting may be present. The paralyzed parts look bluish. There may be a moderate elevation of temperature. The pulse-rate is increased, and is usually out of proportion to the elevation of temperature. There is frequent vomiting. The reflexes are abolished at the seat of compression. If the pressure is high up, there is increase of the reflexes in the parts below.

In fracture of the spine the symptoms appear suddenly; the most common seat of fracture is at the fifth and sixth cervical and the last dorsal and first lumbar vertebræ, but it may occur anywhere.

The fractured bones are driven in upon the spinal cord, compressing it or cutting it off entirely. Occasionally the compression does not occur at once, but later. Motion causes a displacement of a portion of the fractured bone to encroach upon the spinal canal.

In caries of the spine there are frequent symptoms of irritation of the nerves passing off from the seat of disease with, perhaps, some paresis and muscular wasting of the parts supplied by those nerves, and paralysis may come on slowly or suddenly. The paralysis in these cases comes on in two ways —either from breaking down of the carious bones and displacement of the fragments, or by the accumulation of pus at the seat of caries, which gradually presses the dura in upon the cord. There are cases in which the paralysis will come on suddenly in an old case of caries, and a good deal of improvement may occur in the paralysis afterward. A careful and frequent examination of the spine in the early stages will reveal the presence of the diseased bone. In case of tumor the symptoms come on gradually and there are many more irritation symptoms.

Pathologic Anatomy.—The most common forms of tumor to develop in the spinal canal are syphilomata, sarcomata, fibromata, and myxomata. Multiple tumors are sometimes found on the nerve-roots. They are usually fibromata or sarcomata, and develop in the membranes and sheaths around the nerves.

The changes which take place in the cord vary. In the immediate vicinity of the compression, and at an early date, the cord is swollen, the axis-cylinders are swollen, the myelin is broken up, there are great vascularity and distention of the blood-vessels, and there may be some spider-cells ; granular corpuscles are always found in the fresh state ; later more or less wasting of the spinal cord occurs. Above and below the seat of injury secondary degenerations occur.

Treatment.—This depends upon the nature of the compression ; they are surgical cases, if the compression is due to caries or fracture. In cases of tumor the question of surgical interference must be considered. (For its indications consult Thorburn, *Surgery of the Spinal Cord ;* Schlesinger on *Tumors of Spinal Cord ;* Starr ; and Collins, *Medical Record*, 1903.)

CHAPTER VIII.

LOCALIZATION OF LESIONS IN THE SPINAL CORD.

ONLY a few words can be said here on this subject. The student must refer to the works on physiology, and with the aid of the accompanying table from Starr and the diagram of the spinal segments and their nerves, in relation to the vertebræ, he will have ample material for study and locating lesions in the cord. This study is of importance, as in injuries of the cord by fracture, tumor, etc., the possibility of surgical interference as a means of relief must be considered, and it is necessary to locate the lesion (Fig. 29).

Lesions of the cauda equina give rise to paralysis, anesthesia, atrophy of muscles, and reaction of degeneration in the distribution of the sciatic nerve; the sphincter ani is paralyzed, while the bladder may remain normal. Lesions of the lower lumbar enlargement give rise to the same symptoms.

Lesions of the upper and midlumbar cord cause paraplegia without paralysis of the abdominal muscles. The paralyzed muscles retain their normal electric reactions, and the reflexes are increased. The sphincter is usually paralyzed. Lesions of the dorsal cord cause paralysis and anesthesia of all parts below the lesion. The line of anesthesia indicates the seat of lesion; the sphincters are paralyzed and reflexes exaggerated.

Lesions at last cervical and first dorsal; paralysis in the ulnar distribution and anesthesia of the lower forearm, ulnar side of hand and fingers; paralysis of flexor carpi ulnaris, etc.; paralysis of intercostal muscles; the line of body anesthesia just below clavicle.

A reference to the table and diagram will make this plain. Paralysis may be caused by a lesion in the anterior horn of the spinal cord; the muscles atrophy, and their electric reactions are changed, and the reflexes are lost for those muscles innervated by that diseased spinal segment. If the

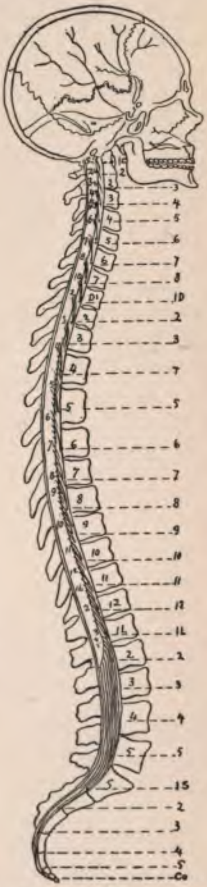

FIG. 29.—Spinal cord (after Gowers).

paralysis is due to an interference with the transmission of voluntary motor impulses through the pyramidal tract, as in paralysis from brain disease, the muscles do not atrophy; the reflexes are exaggerated, the tonicity of the muscles is increased, and there may be rigidity; the normal electric reactions are preserved. Loss of reflex indicates a lesion which interferes somewhere with the reflex arc for that spinal segment. Normal reflex indicates that the arc is intact; exaggerated reflex, that the inhibitory action of the brain is removed, and always indicates a cutting off (or irritation) of the pyramidal tract from the brain somewhere in its course; the reflex is exaggerated below the focus of disease (Fig. 30).

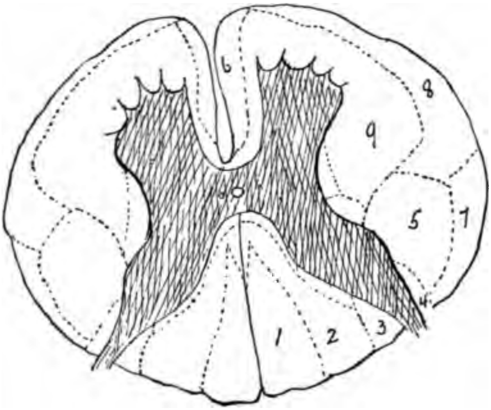

FIG. 30.—1, Column of Goll; 2, column of Burdach; 3, internal marginal zone of Lissauer; 4, external marginal zone of Lissauer; 5, crossed pyramidal tract; 6, direct pyramidal tract; 7, direct cerebellar tract; 8, Gowers' tract; 9, deep portion of lateral column.

For further information on this subject the student can refer to Thorburn, The Surgery of the Spinal Cord; Seguin, Pepper's System of Medicine; Starr, chapters on Localization of Spinal-cord Diseases, Familiar Forms of Nervous Disease, Text-Book on Organic Nervous Diseases, 1903; Head, Brain, 1900, 1902.

Localization of the Functions of the Segments of the Spinal Cord.—(*Starr.*)

SEGMENT.	MUSCLES.	REFLEX.	SENSATION.
Second and third cervical	Sternomastoid, trapezius, scaleni and neck, diaphragm.	Hypochondrium (?); sudden inspiration produced by sudden pressure beneath the lower border of ribs.	Back of head to vertex; neck.
Fourth cervical	Diaphragm, deltoid, biceps, coracobrachialis, supinator longus, rhomboid, supra- and infraspinatus.	Pupil, fourth to seventh cervical; dilatation of the pupil produced by irritation of the neck.	Neck, upper shoulder, outer arm.
Fifth cervical	Deltoid, biceps, coracobrachialis, brachialis anticus, supinator longus, supinator brevis, rhomboid, teres minor, pectoralis, serratus magnus.	Scapular, fifth cervical to first dorsal; irritation of the skin over scapula produces contraction of the scapular muscles, supinator longus; tapping its tendon in wrist produces flexion of forearm.	Back of shoulder and arm; outer side of arm and forearm, front and back.
Sixth cervical	Biceps, brachialis anticus, pectoralis (clavicular part), serratus magnus, triceps, extensors of wrist and fingers, pronators.	Triceps, fifth to sixth cervical; tapping elbow tendon produces extension of forearm; posterior wrist, sixth to eighth cervical; tapping tendon causes extension of hand.	Outer side of forearm, front and back; outer half of hand.
Seventh cervical	Triceps (long head), extensors of wrist and fingers, pronators of wrist, flexors of wrist, subscapular, pectoralis (costal part), latissimus dorsi, teres major.	Anterior wrist, seventh to eighth cervical; tapping anterior tendons causes flexion of wrist; palmar, seventh cervical to first dorsal; striking palm causes closure of fingers.	Inner side of back of arm and forearm; radial half of hand.
Eighth cervical	Flexors of wrist and fingers, intrinsic muscles of hand.		Forearm and hand, inner half.
First dorsal	Extensors of thumb, intrinsic hand muscles, thenar and hypothenar eminences.		Forearm, inner half; ulnar distribution to hand.
Second to twelfth dorsal	Muscles of back and abdomen, erectores spinæ.	Epigastric, fourth to seventh dorsal; tickling mammary region causes retraction of the epigastrium; abdominal, seventh to eleventh dorsal; striking side of abdomen causes retraction of belly.	Skin of chest and abdomen in bands running around and downward corresponding to spinal nerves; upper gluteal region.

LOCALIZATION OF THE FUNCTIONS OF THE SEGMENTS OF THE SPINAL CORD.—(*Starr.*) (*Continued.*)

SEGMENT.	MUSCLES.	REFLEX.	SENSATION.
First lumbar	Iliopsoas, sartorius muscles of abdomen.	Cremasteric, first to third lumbar; striking inner thigh causes retraction of scrotum.	Skin over groin and front of scrotum.
Second lumbar	Iliopsoas, sartorius, flexors of knee (Remak), quadriceps femoris.	Patella tendon; striking tendon causes extension of leg.	Outer side of thigh.
Third lumbar	Quadriceps femoris, inner rotators of thigh, abductors of thigh.		Front and inner side of thigh.
Fourth lumbar	Abductors of thigh, adductors of thigh, flexors of knee (Ferrier), tibialis anticus.	Gluteal, fourth and fifth lumbar; striking buttock causes dimpling in fold of buttock.	Inner side of thigh and leg to ankle; inner side of foot.
Fifth lumbar	Outward rotators of thigh, flexors of knee (Ferrier), flexors of ankle, extensors of toes.		Back of thigh, back of leg, and outer part of foot.
First and second sacral	Flexors of ankle, long flexors of toes, peronei, intrinsic muscles of foot.	Plantar; tickling sole of foot causes flexion of toes and retraction of leg.	Back of thigh, leg, and foot, outer side.
Third to fifth sacral	Perineal muscles.	Foot reflex, Achilles tendon; overextension of foot causes rapid flexion, ankle-clonus, bladder and rectal centers.	Skin over scrotum, anus, perineum, genitals.

CHAPTER IX.

MULTIPLE DIFFUSE SCLEROSES.

THIS syndrome manifests itself as a result of a number of causes. It cannot be regarded as a single disease entity. Scanning speech, exaggerated knee-jerks, ankle-clonus, nystagmus, and intention tremor are the main symptoms. To these are added a variety of localizing symptoms that indicate in part the location of many of the lesions.

Etiology.—It is observed in youth and middle age. It is said to follow blows or intense emotional excitement; it develops after the eruptive fevers, measles, typhoid, etc. Malaria, tuberculosis, or syphilis in turn may bring about the syndrome.

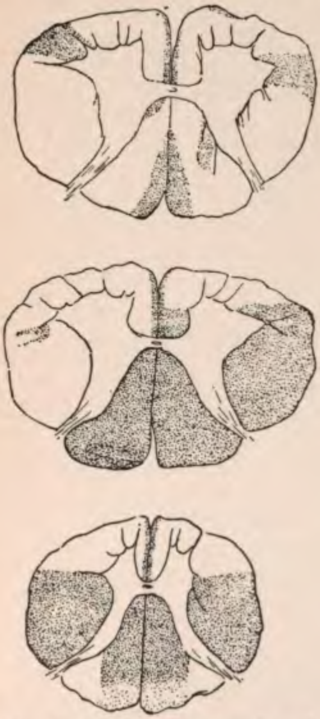

FIG. 31.—The shaded areas show the scattered distribution of the sclerosis at various levels of the spinal cord in a case of disseminated cerebrospinal sclerosis.

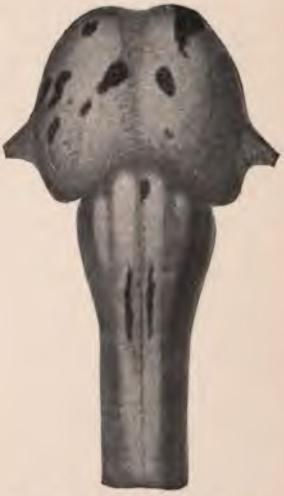

FIG. 32.—Lesions of the insular sclerosis in the pons and medulla (Charcot).

Symptoms.—The affection usually develops slowly as paresis in the lower extremities or in some eye muscle; slow and difficult gait with ataxia and paresthesia. There may be some disturbances in sensation in places about the extremities or body; vertigo; headache; tremor on voluntary efforts is common; speech is early affected—it is drawling, slow, and indistinct. Vision may be impaired; nystagmus is almost constant in this variety; there may be apoplectiform or epileptiform seizures, and there are contractures and rigidity in the limbs; the reflexes are exaggerated; tremor is almost constant, particularly on voluntary motion; it is often so violent when attempting to take any object that it is almost impossible to do so. Its true character is brought out by having the person attempt to raise a glass of water to the mouth.

Trophic disorders, bladder and rectal disturbances, are rarely found in this disease. In the spinal form the gait is decidedly spastic so long as the person can walk. When he cannot, the legs are stiff and extended; the disorder has a wonderful resemblance to spastic paraplegia, for which it can be readily mistaken.

Pathologic Anatomy.—Sclerotic patches scattered at various points without any order throughout the cerebrospinal axis. Increased activity in the neuroglia and its cells, which soon becomes so great that the nerve tissue is injured; the nerve-fibers gradually disappear, leaving the increased connective tissue with its very much enlarged cells; the field of a section at this stage is best seen by reference to an illustration, showing the almost entire absence of nerve-fibers; a few axis-cylinders are observed and a large number of "spider cells"—cells with long processes. The patches may be of very varying causation (Figs. 31, 32).

Treatment.—Tonics and alteratives are of service, but only as palliatives, as the disease is steadily progressive. Antisyphilitic treatment may in rare instances be of service in non-typical cases.

Bibliography.—Marie, Maladies de la Moelle.

SECTION IV.

DISEASES OF THE MENINGES—SPINAL AND CEREBRAL.

MENINGITIS.

ACUTE SPINAL MENINGITIS (Leptomeningitis).

ACUTE meningitis confined to the spinal meninges is a very uncommon condition.

Etiology.—As predisposing causes: the tuberculous and scrofulous diathesis; weakly constitutions; residence in unhealthy, damp places, with poor food and clothing. It occurs after rheumatism and pneumonia. It may occur as a complication in localized disease of the spinal column, such as caries or tumors. It may also be caused by infection.

Symptoms.—There are a feeling of heaviness, lack of desire to move about, but restlessness; pains in the back soon follow, with some elevation of temperature, irregular in type; pains radiating along the nerve-trunks, which may be severe or slight; cramps in the muscles of the extremities, so that the legs may be drawn up or kept in some unnatural position; the reflexes are increased; there is hyperesthesia of the skin; retention of urine may be present; the bowels are constipated. If the disease increases, there will be opisthotonos; disturbances of respiration and the muscular spasm give place to paralysis in some muscular groups; in place of the hyperesthesia we find anesthesia more or less marked.

The medulla may become involved; paralysis of muscles of the eye, disturbances of respiration, and coma, followed by death. There are often periods of remission.

Pathologic Anatomy.—(See Meningitis; Diseases of the Brain.)

Acute Meningitis (Leptomeningitis Infantum).—It is by no means confined strictly to the convexity; it occurs mostly in children, but may affect adults; its exciting causes are not well known. Injuries are assigned as cause in some cases.

Symptoms.—It often begins suddenly, but there may be premonitory symptoms: headache, followed by chill, with rise in temperature and increased pulse-rate; in young children there may be convulsions or convulsive twitchings in the muscles of the face or extremities; vomiting and nausea are frequent symptoms; delirium may occur. The child lies in a dull, drowsy condition, with distressed facial expression, is irritable, and does not like to be disturbed; photophobia is almost constant. If the base of the brain becomes involved, there is strabismus, which at first may be passing and later permanent. Changes in the pupils are constant; rigidity in the back of the neck; later, the stupor gives rise to coma. There may be retraction of the abdomen. Paroxysms of screaming may occur, resulting from nutritional disturbances and from pressure of the hydrocephalic fluid and the disturbances in the vessels. The respiration becomes labored and assumes the Cheyne-Stokes character; the coma deepens, and death occurs quietly or with a convulsion.

Meningitis Purulenta (Leptomeningitis with Pus).—This is also at times called meningitis of the convexity, but is frequently generalized, and even begins as a basilar meningitis.

Etiology.—In many cases it is very difficult to assign a cause; it occurs at all ages—in infants, in young persons, and in adults. Men are most liable to it. It occurs secondary to purulent inflammation of the middle ear with bone disease; from injuries to the bones of the skull; after erysipelas, pneumonia, etc.; from disease of the parts about the nose, eyes, and head. It may follow immediately, or may occur with dysentery, typhus, typhoid, scarlet fever, variola, measles, and la grippe. Bacteriology has shown that in a large proportion of cases a bacterium is found. The most common is the pneumococcus; there have also been found streptococci, the tubercle, coli, and typhoid bacilli. There may be more than one variety of bacteria found in an individual case. These bacteria may find their way through the lymphatics from distant foci.

Symptoms.—It is generally sudden in its onset: a chill, fever irregular in type, severe headache, and delirium. Vomiting may occur; the pain may be referred to any part of the head; light and noise are distressing; there may be disturbances of speech; aphasia; the headache may be intense, and in children give rise to screams; strabismus, sluggish or fixed pupils; muscular twitchings may occur; there may be paralysis if large accumulations of pus occur in the motor areas so as to cause pressure; in children there may be grinding of the teeth and trismus. The mode of death is similar to that in other varieties of meningitis.

Pathologic Anatomy.—In purulent leptomeningitis the meshes of the pia are filled with pus, especially along the vessels; the process may be most intense at the convexity or base if it is the result of middle-ear disease; the pus from the ear often finds its way along the fifth or the auditory nerve, and consequently the base of the brain is first and most extensively affected. In leptomeningitis infantum there are often no definite changes discoverable after death except the presence of exuded white corpuscles, anemia, light edema; this may be the result of the rapidly fatal termination in some cases.

Prognosis is unfavorable in all these cases.

Treatment.—At present treatment gives no favorable results. Morphin to relieve the pain is indicated, or, better, codein. Surgery sometimes offers some opportunities.

Tuberculous Meningitis.—**Etiology.**—The tuberculous diathesis and a neuropathic constitution; it occurs among the rich as well as the poor; it is most frequent between the ages of two and ten years; males are more frequently affected. The bacillus is the main exciting cause.

Symptoms.—As premonitory symptoms, general indisposition, slight headache, loss of appetite and flesh, constipation, etc.; this may exist for weeks before pronounced symptoms appear. The symptoms vary much in different cases: there may be a chill; severe headache; photophobia; a rise of temperature; vomiting may occur; indisposition to move; there may be spasmodic twitchings in the muscles of the face or extremities; there soon occur lancinating pains in the head, during which the child screams, shrieks out, or moans and tosses about. The pupils may show no change at first, but soon there are inequalities and sluggishness in the light reactions, with spontaneous oscillations; later, they are fixed; there is now passing paresis of some eye muscles, so that there is, at times, strabismus; later it is constant. Retraction of the head and rigidity of the muscles of the neck soon develop; the face is dusky, and there is stupor, from which the child is with difficulty aroused. The abdomen may or may not be retracted; light and noise become more and more intolerable; the temperature may run high. There may be delirium, but it is not common. Optic neuritis may be found. As the disease progresses convulsions may occur; and later, coma and difficult respiration with frequent irregular and weak pulse close the scene.

Prognosis.—Unfavorable.

Pathologic Anatomy.—The pia is studded more or less thickly with tuberculous nodules, especially over the base; they surround the blood-vessels of the pia and even those entering the brain; there is some slight edema with fibropurulent deposit. The internal hydrocephalus which is present explains, in part, some of the symptoms.

SECTION V.

DISEASES OF THE BRAIN—THE CEREBRAL VESSELS AND OTHER NON-NERVOUS ELEMENTS.

CHAPTER I.

THE LOCALIZATION OF BRAIN DISEASES.

We have spoken of the general symptoms of brain diseases, including headache, dizziness, vertigo, vomiting, etc. These symptoms may occur in the course of any brain disease, and indicate an irritation of the brain or arrest of its functions as a whole, and have, therefore, no direct value in localizing the lesion. The local symptoms of brain disease, on the other hand, are produced by affections of different parts of the brain, and each symptom shows that a particular part is disordered.

These symptoms are *spasm* or *paralysis* of one or two limbs or of one-half of the body; loss of perception of touch, temperature, pain, or position of one or two limbs or of one-half of the body; loss of visual power or of the power of smell, taste, hearing, and aphasia or disturbance of speech.

It will be observed that these symptoms may be entirely wanting in some cases of disease when that does not involve the portions of the brain concerned in sensation or motion. One of them may occur alone if the lesion is of small extent, or they may occur in certain combinations.

Convulsive movements limited to a portion of the body and when extending to other parts, following a definite order of progress, such as leg, arm, face, etc., are symptoms of irritation in the cortical motor area of the brain (Fig. 33). Such irritation originates in the cortical cells as spasms, and rarely occurs *from* subcortical lesion. (The experiments of Ferrier on the brain of the monkey are of great interest in the study of these conditions.) Each hemisphere, it will be remembered, controls the movements of the opposite side of the body.

Limited convulsive movements are termed cortical spasms, or Jacksonian epilepsy. It is important to notice the order of extension of the spasm, as this gives a clue to the point on the cortex where the irritation begins. These localized spasms do not induce a loss of consciousness.

Paralysis is a symptom of local disease in the motor area of the brain or in the *tract* from it to the spinal cord.

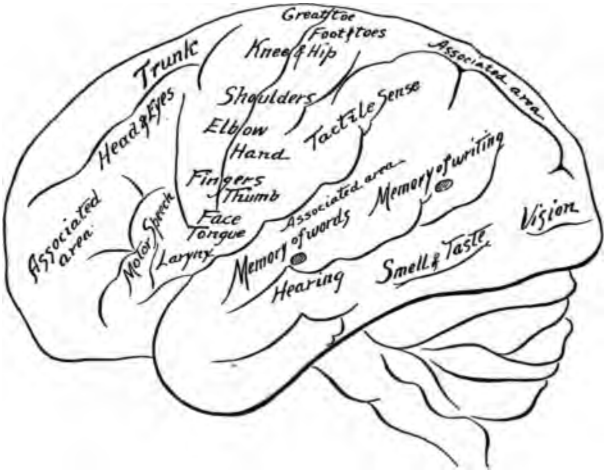

FIG. 33.—Localization in the cerebral cortex.

When only one member is affected, the disorder is called monoplegia; paralysis of one side is termed hemiplegia; when both hemispheres are affected, the disorder is called diplegia, and when both legs are affected, it is usual to speak of the disorder as paraplegia.

Paralysis may also be due to an interruption in the tract that conveys the impulses to the motor centers in the base of the brain and cord (subcortical paralysis). The vast majority of cases of hemiplegia are due to a lesion of the internal capsule (Fig. 34).

Hemiplegia associated with submotor palsy, with or without hemianopsia, is characteristic of a lesion in the crus (Fig. 35).

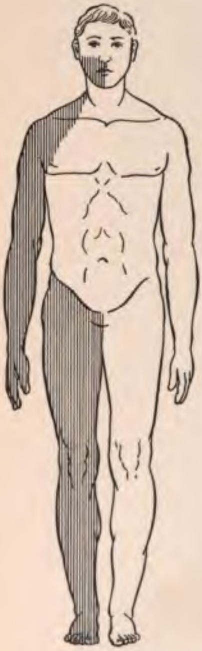

Fig. 34.

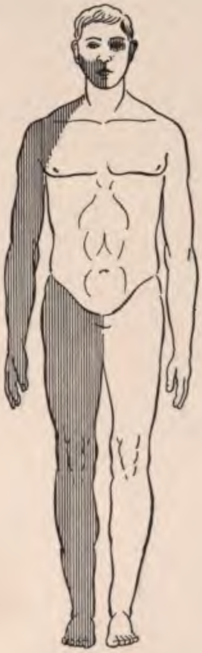

Fig. 35.

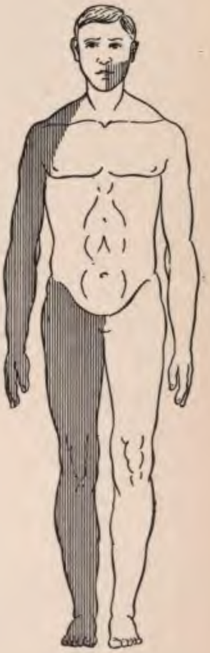

Fig. 36.

FIG. 34.—Common type of hemiplegia occurring from hemorrhage in the internal capsule. The shaded parts indicate the distribution of the paralysis.

FIG 35.—The type of hemiplegia which occurs in lesions of the crus cerebri. The shaded portions indicate the paralyzed parts.

FIG. 36.—The type of hemiplegia occurring in lesions low down in pons varolii. The shaded parts indicate the distribution of the paralysis.

The eye affected is, of course, the one on the side of the lesion, and opposite to the paralysis of the face, arm, and leg.

Hemiplegia may be due to lesion in the upper part of the pons, but when the lower part of the pons is affected, the face escapes on the side on which the limbs are paralyzed, but the opposite side of the face is paralyzed—the alternating or crossed paralysis (Figs. 36, 37).

Disturbances of touch are probably due to lesion in the posterior central convolution and the parts immediately adjoining. Lesion of this area causes a loss of tactile sense on the opposite side of the body. The loss of power of recognition by touch is called astereognosis.

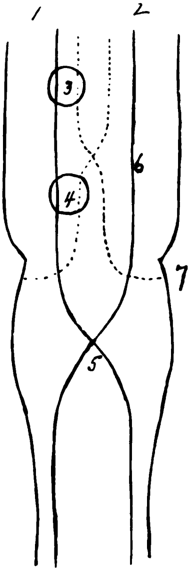

FIG. 37.—To show decussation of facial nerve in pons varolii: 1, 2, Right and left half of pons; 3, 4, lesions at upper and lower half of pons on one side; 5, decussation at pyramids in medulla: 6, fibers in pons which decussate in the medulla; 7, facial nerve-fibers, which are shown crossing in the middle of pons (after Nothnagel).

Disturbances of vision are a local symptom of cortical disease of the occipital lobe of the brain and of the visual tracts from the eyes to it. Lesion anywhere in the occipital be causes hemianopsia or blindness in the corresponding halves of the retina of each eye (Fig. 38). If the lesion is in the cuneus, there is homonymous hemianopsia (Fig. 39); if in

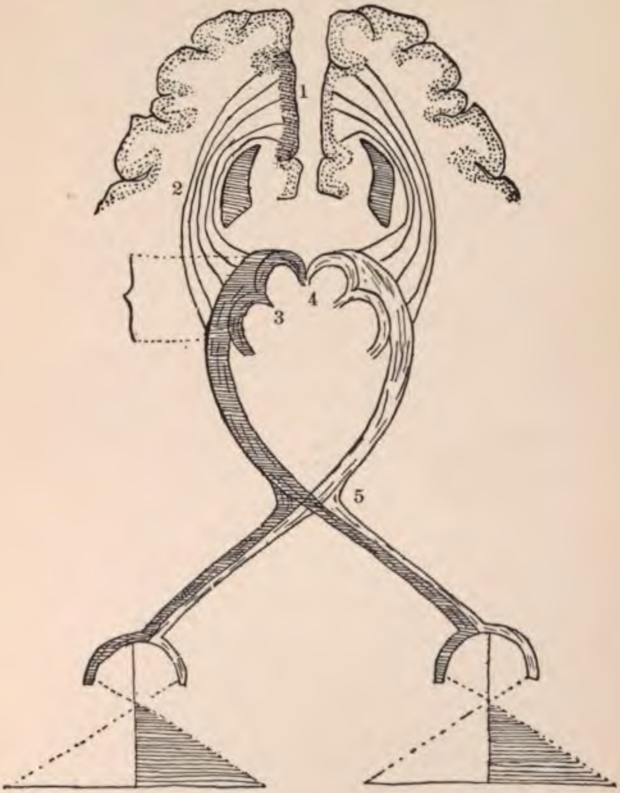

FIG. 38.—To show left lateral hemianopsia; lesion in right cuneus: 1, Cuneus; 2, optic tract in internal capsule; 3, corpus geniculatum laterale; 4, corpora quadrigemina, optic lobes; 5, optic chiasm (after Seguin).

the neighborhood of the thalamus, so as to interfere with the sensory tract in the internal capsule, there may be hemianesthesia; if in the neighborhood of the crus, so as to interfere with the motor tract, there may be hemiplegia and paralysis of the third nerve on the opposite side.

Total blindness may also be caused by drugs such as methyl-alcohol.

Disturbances of Hearing.—Brain diseases rarely cause total deafness, as each ear is connected with both temporal lobes. The center for hearing is in the middle part of the first temporal convolution. In the congenital deaf-mute this part is found atrophied.

Disturbances of Smell.—When determining disturbances with this sense, the student must be careful to select non-irritant volatile substances, as ammonia, ether, etc., cause irritation of the sensory filaments of the fifth nerve and are, therefore, not true guides to disturbances of smell. The exact location of the sense of smell is uncertain, but the apex of the temporal lobes appears to be the probable site.

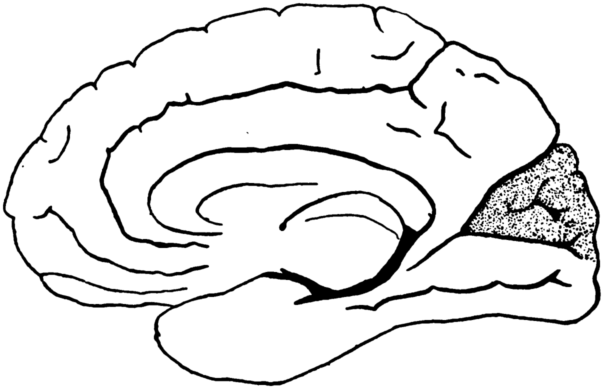

FIG. 39.—Lesion of cuneus in hemianopsia.

Disturbances of Taste.—This center also is not positively known, but we know that memories for taste are stored in the cortex of the uncinate convolution. (Reference to Fig. 33 will define these centers.)

Disturbances in the control of the **emotions** are produced by lesion in the frontal area of the cerebrum. The same symptoms are noticed in lesion of the anterior portion of the corpus callosum which unites the two frontal lobes. It has also been noticed that lesions in the thalamus interfere with the automatic expression of emotion.

APHASIA.

By aphasia was originally meant an inability to express thought in words. In 1861 Broca called attention to well-defined softening of the brain in two patients who had been aphasic. This softening was located in the posterior part of the third or inferior convolution on the left side. Although Broca contended that the position on the left side was probably accidental, further reports indicate that aphasia follows disorganization on that side far more frequently than on the right; in fact, in about 88 per cent. of cases, which is approximately the ratio of right- to left-handed people. As the knowledge of the interdependence of the brain parts grew, it was seen that the area of the brain limited to the convolution of Broca was frequently not the only part involved, but that other and more distant parts were correlated in the function of intelligent speech.

Thus grew up the conception of the zone of language comprising—(1) Broca's convolution, lesion of which causes inability to remember movements necessary for articulation; (2) the superior temporal convolution, lesion of which causes inability to understand spoken words—*i. e.*, word-deafness; (3) the angular convolution, lesion of which causes inability to interpret words that can be seen—*i. e.*, word-blindness (see Fig. 33).

These three collections of cells or centers are connected by fibers known as associative tracts.

The subject of aphasia can be conveniently studied under five headings:

(1) True aphasia. (2) Motor aphasia. (3) Sensory aphasia. (4) Associative aphasia. (5) Combined conditions.

1. True or intellectual aphasia would follow upon a lesion in any one of the three brain areas involved. When all three areas are involved, the condition is called complete aphasia. Seldom is the aphasia so complete as to cut off the subject from entire communion with his fellows.

2. **Motor Aphasia.**—The subject can here understand what is said to him, but cannot repeat or speak voluntarily. He can recognize things about him, but cannot name them. He can hear and recognize what is said, but can make no reply.

The lesion can be differentiated into cortical and subcortical. When cortical, the patient would not be able to speak at all, excepting very few familiar words, such as yes and no. When the lesion is subcortical, the patient would not be able to speak, but could indicate the number of syllables a word contained by pressing the hand once for each syllable. As a rule, in motor aphasia there is also inability to write (agraphia). It is still a question if there be a special writing center.

3. **Sensory Aphasia (Apraxia).**—In this form there is loss or impairment of the power to recognize the nature and characteristics of objects.

The patient may be able to read, but the words convey no intelligent impression to his mind. Of the forms of apraxia, mind-blindness and mind-deafness are the most important.

4. **Associative aphasia** results from a disturbance of connection between the parts comprising the central structure. There is a form known as mixed aphasia or paraphasia, in which the patient understands what is said and can speak long sentences correctly, but he constantly tends to misplace words and does not express the ideas in the proper words. All grades of this may be met with, from a state in which only a word or two is misplaced to an extreme condition in which the patient talks jargon.

5. **Combined aphasia** is, as its name suggests, two or more of the above forms in one individual.

The following tests should be applied in each case of aphasia:

1. Can the patient hear words spoken?
2. Can he understand words spoken?
3. Can he see words written or printed?
4. Can he understand words written or printed?
5. Can he speak voluntarily?
6. *Can* he repeat words?
7. *Can he read* aloud?

8. Can he write voluntarily?
9. Can he write to dictation?
10. Can he copy?

An examination of the usual form of aphasia—the Broca type of motor aphasia—will show the answer "yes" to the first four questions and "no" to the last six.

Lesion of the basal ganglia, namely, the corpora striata, composed of the lenticular and caudate nuclei, and the optic thalami are very common. These are lesions of the various tracts in the internal capsule. It would seem evident that we cannot locate a lesion in the ganglia from any direct symptom. The *caudate nucleus* is supposed to have some relation to motion of the legs, and the lenticular to those of the arms. The lenticular nucleus has also been thought to have some relation to acts of eating. The hemichorea and hemiathetosis occasionally seen after lesion of the thalamus are probably symptoms of irritation constantly exerted upon the motor and sensory tract passing near it. The thalamus is, however, doubtless a sensory ganglion, as lesions of the pulvinar cause hemianopsia. It is also known that all the sensory tracts end in the thalamus, which is connected by its radiation with all parts of the cortex. Each sensory tract is bilateral, so that a unilateral lesion of the thalamus causes no complete loss of sensation. The basal ganglia have important reflex functions. They are practically a higher development of the spinal cord, the anterior part of the spinal cord being represented by the corpora striata and the posterior by the optic thalami. The thermic centers for the regulation of temperature of the body have been located by physiologists in the optic thalami. Vasomotor, secretory, and trophic control of the opposite side of the body have been assigned to the thalamus.

Lesions of the corpora quadrigemina are rare. When the anterior lobes are involved, oculomotor palsy, loss of pupil reflex, strabismus, and nystagmus may be produced. If the posterior pair are involved, disturbances of coördination and of hearing may be caused. Both pairs are usually affected together.

Lesion of the tegmentum of the crura cerebri, which lies *beneath the* corpora quadrigemina, will cause anesthesia as the sensory tracts pass through this region. Lesion of the foot of the crus cerebri in which the motor tract passes causes hemiplegia of the opposite side. As the third nerve passes through the foot of the crus a lesion here causes a paralysis of this nerve on the side of the lesion. For instance, a hemiplegia of one side with third-nerve paralysis of the other side indicates a lesion of the foot of the crus on the side of the third-nerve paralysis.

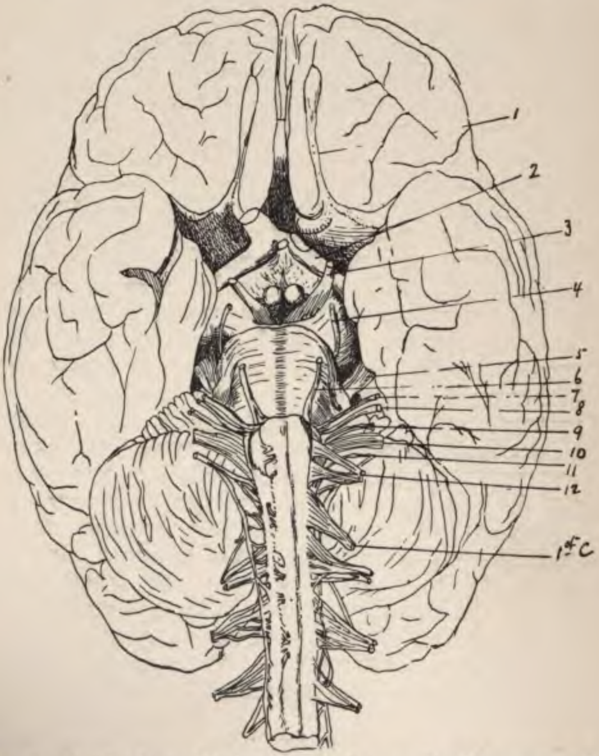

FIG. 40.—Showing base of brain. The numbers on the plate correspond to the respective cranial nerves.

Lesion of the Pons and Medulla.—It is convenient to study these together, as practically they are continuous. The exact level of the lesion will be indicated by the nerves affected; oculomotor palsy being caused by lesion in the crus cerebri; fifth-, sixth-, seventh-, and eighth-nerve paralysis being caused by lesion in the pons, and ninth-, tenth-, eleventh-, and twelfth-nerve paralysis being caused by lesion in the medulla (Fig. 40). The gross lesions, like hemorrhage and their effects, have already been considered. The knowledge of location of the various nuclei of the cranial nerve will indicate at once the site of the lesion. The pons also contains the middle peduncle of the cerebellum, so that lesions in the pons are likely to cause symptoms of the cerebellar type.

Lesions of the Brain Base.—Disorders of smell would be a guide to lesions in the anterior fossa. Paralysis is not caused by lesions in the part of the brain resting in this portion of the skull unless they grow backward, so as to compress the cranial nerves situated further back (Fig. 41). It has occasionally been observed that tumors of the brain base cause an emotional disturbance of excessive laughter.

Lesions of the hypophysis (pituitary body) are not uncommon. Almost invariably there is found the peculiar enlargement of the body previously described under Acromegaly. In most autopsies on acromegaly a lesion of the hypophysis, usually a tumor, has been found. The converse is not true, as lesions of the pituitary body have been found in which the skeleton was normal. Excessive somnolence is also a feature in lesion of the hypophysis. In a case under my observation the patient would fall asleep at her meals—frequently while raising a cup of coffee to her mouth.

It is conceivable that a large growth in the neighborhood of the hypophysis may cause compression of the optic tracts and olfactory lobes, and when the tumor is very large, the pons and cerebellum may be pressed upon. If the pressure be great, there may be paralysis, but, as a rule, death occurs before pressure is great enough to cause paralysis. There may be glycosuria in these cases. Tumors anywhere in the neighborhood of the fourth ventricle may cause the symptoms.

Lesion of the cerebellum when located in the hemispheres *and not in the* median lobe may not cause any symptoms. If the lesion is in the median lobe (vermis), disturbances of coördination peculiar in type occur. The ataxia exists only when the patient is in an upright position, and when he attempts to walk, he walks like a drunken man. The arms are seldom affected. Another characteristic symptom is vertigo, which is always increased when he opens his eyes. The ataxia and vertigo together strongly indicate disease in the middle lobe of the cerebellum.

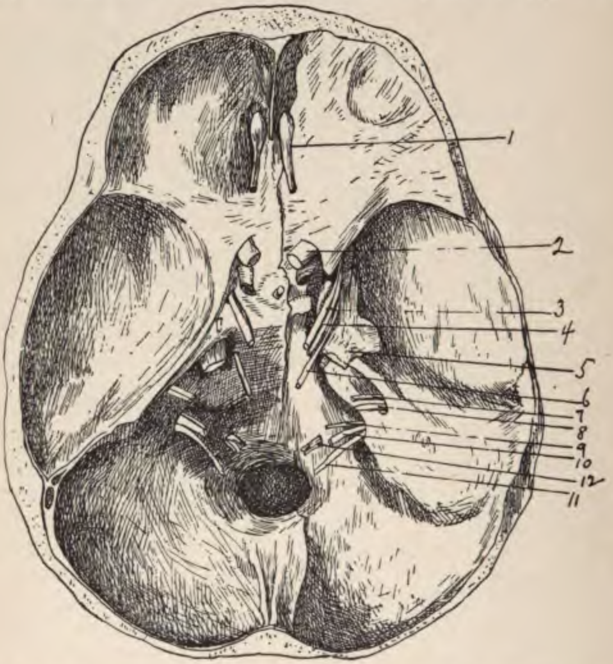

FIG. 41.—Showing base of skull with the cranial nerves as they pass through their foramen of exit; the numbering corresponds to the nerves.

Deficient development of the cerebellum is frequently und in congenital idiocy.

Lesions of the middle peduncles of the cerebellum *use a distinct* tendency to assume a forced position, to turn toward or to fall toward one side in walking, or to revolve constantly about one axis of the body.

Bibliography.—Collins, The Faculty of Speech. Elder, Aphasia and the Cerebral Speech Mechanism. Strümpell, Text-book of Medicine. Starr, Organic Nervous Diseases. Mills, The Nervous System and Its Diseases. Ferrier, Functions of the Brain.

CHAPTER II.

DISEASES OF THE BRAIN.

APOPLEXY.

Apoplexy is a term which includes at least three different characteristic lesions—hemorrhage, thrombosis, and embolism of branches of the cerebral arteries.

CEREBRAL HEMORRHAGE.

Etiology.—Some persons appear predisposed; the disease occurs usually after forty years of age; it is more frequent in men; anything which tends to produce degeneration and disease of the cerebral arteries predisposes to it. Disease of the cerebral arteries is the prime cause. Under these circumstances any great increase in the arterial tension may cause rupture of the vessel.

Symptoms.—The attack is frequently ushered in without any warning; in other cases there are premonitory symptoms: dizziness, headache, numbness in the extremities on one side, mistakes in talking or writing, irritability. In the simplest attack the person falls suddenly, or rather slowly drops down, is confused, but may not lose consciousness; or if he does, it is only momentary, there is more or less paralysis on one side. In the more severe attack he loses consciousness, falls, breathes heavily; face is flushed, dusky, and swollen; profuse perspiration breaks out all over the body; the respiration becomes puffy; the arteries throb; the conjunctiva is injected; the eyelids are *closed*; the person lies in a heap, as it were. If the extremities are picked up, it will be found that they drop heavily when let go, but much more so on one side than on the other—the paralyzed side. Immediately after the attack the temperature is lowered, and in cases which die in a few hours it remains low. If death does not take place soon, there is a rise in the temperature, and if the condition does not progress favorably, the temperature keeps rising until it may reach 106° or 108° F. before death. In the cases which progress favorably the elevation in temperature subsides in oscillations to the normal. There are a number of localizing symptoms depending on the situation of the hemorrhage, whether cortical, subcortical, in the thalamus, pons, or medulla. If recovery from the immediate symptoms occurs, the person may be paralyzed on one side—arm, leg, and lower facial muscles—hemiplegia. If the hemorrhage occurs so as to injure the sensory tract in the posterior part of the internal capsule, there will be either permanent or passing hemianesthesia.

If the hemorrhage is on the left side, there may be aphasia. After a short time the person may be able to walk about; the paralyzed extremities become stiff (early rigidity); the joints are swollen and painful; the circulation is impaired; this early rigidity gives place to a certain amount of contracture (late rigidity). The reflexes on that side are exaggerated. No muscular wasting takes place, and the electric reactions are not changed. Very exceptionally an acute muscular wasting may occur, in which event it is found to be due to a secondary lesion in the anterior horns of the spinal cord. It occasionally happens that the onset of a cerebral hemorrhage is accompanied with convulsions; this is the case when the hemorrhage breaks into the ventricle or perforates the cortex, so that the blood is poured out into the base of the brain. Sufferers from cerebral hemorrhage rarely recover their former mental vigor; they are emotional, unable to do mental work, and in some cases there is marked mental enfeeblement or even dementia.

Pathologic Anatomy.—The greatest number of hemorrhages occur in the corpus striatum and its neighborhood. Charcot and Bouchard years ago pointed out that miliary aneurysms could be found in nearly all these cases; a form of periarteritis is the condition which leads to the formation of these aneurysms. Atheromatous changes in the vessels may also lead to rupture. It is believed that primary fatty degeneration of the vessels is the cause of the rupture and hemorrhage in young persons. After the hemorrhage has destroyed the motor fibers in the internal capsule a secondary degeneration downward takes place in the anterior pyramid in the medulla, and in the direct and crossed pyramidal tract in the spinal end. This degeneration in the cord is associated with the contracture and the exaggerated reflexes.

Prognosis.—This depends upon the extent of the hemorrhage; a study of the temperature will be found of service in all cases where the hemorrhage is at all extensive. Permanent hemiplegia is the result.

Treatment.—The clothing should be loosened, and the head placed in an easy position. Many observers have suggested lowering the arterial tension by the use of inhalations of nitrite of amyl, nitroglycerin, by the mouth or hypodermically. Gelsemium, aconitin, and other vascular depressants can be used. Venesection is advisable in many cases, especially in those with the so-called apoplectic habit. The contracture which occurs as a late symptom can best be ameliorated by massage and electricity.

OCCLUSION OF VESSELS (Embolic Closure; Thrombosis; Endarteritis; Thrombosis of Cerebral Sinuses).

Etiology.—Valvular disease of the heart, with fibrinous deposits, which may be washed off into the circulation; absorption of foreign material, like blood-clots, etc., from injuries of all kinds; portions of morbid growths, which may be detached and enter the circulation; disease of the blood-vessels which narrows their caliber (endarteritis) or roughens the internal surface (atheroma) and gives rise to a tendency to the deposit of fibrin at this point, altered conditions of the blood as the result of exhausting diarrhea, and other wasting diseases. Embolism is more common in the young; thrombosis and hemorrhage in the aged. Symptoms of embolic closure of an artery are very similar to those observed in cerebral hemorrhage; in fact, it is frequently impossible to make a differential diagnosis; the loss of consciousness is usually not so great in *embolism*, but as all degrees of loss of consciousness occur in cerebral hemorrhage, depending upon the extent of the hemorrhage and its location, this is not worth much as a differential point; the presence of decided valvular disease of the heart would be of more value, but even this does not make a positive differential diagnosis, as a rupture of a cerebral vessel is just as likely to occur in such a case. If the vessel plugged be large, such as the middle cerebral, which is the most commonly closed, and the left side most frequently, the area of subsequent softening is large, and we have the hemiplegia as found in cerebral hemorrhage.

Thrombosis.—The symptoms may come on very slowly, with many premonitory signs, and the paralysis is slowly progressive—not sudden as in hemorrhage and emboli. The paralysis is hemiplegic in type, and all the other symptoms found in cerebral hemorrhage are present.

Thrombosis of the cerebral sinuses occurs in children usually. The symptoms are indefinite: convulsions, headache, nausea, vomiting, spasmodic condition of various muscles of the eyes, face, and limbs are said to be present. This must be an exceedingly rare condition, and it is highly probable that some of the symptoms which have been attributed to thrombosis of the sinuses are due to anemia from exhausting disease or to an early stage of basilar meningitis.

Pathologic Anatomy.—Embolic plugs are formed either by fragments of fibrin washed off from the diseased valves of the heart or from fatty detrital masses from old blood extravasations after injuries which in the process of absorption enter the general circulation, or possibly from small detached portions of morbid growths in the large cavities of the body which encroach upon and open into a vessel, or from the deposit of fibrin in an aneurysmal dilatation, or from broken-down atheromatous patches. After the artery is plugged, softening of the cerebral tissue in the area of the arterial distribution occurs. The same occurs in thrombosis and endarteritis.

SPASTIC HEMIPLEGIA IN CHILDREN.

Etiology.—Most of the cases occur in the first three years of life, but they may occur even at a later period. The disease is caused possibly by abnormal conditions of the mother during pregnancy. Accidents and injury to the mother are possible causes. Sinkler has insisted upon difficult and abnormal labors as a cause; injuries to the head; the infectious diseases.

Symptoms.—It often begins, just after birth, with convulsions, either local or generalized; there may be a series of convulsions, coming on at intervals and lasting several days, with hemiplegia, which remains permanent; or the child may die within the first twenty-four or thirty-six hours. The disease, when it occurs later in life, is usually ushered in by convulsions, with or without fever. After the convulsions cease the child is found hemiplegic; the face is not always affected; the hemiplegia is usually not complete, so that the child soon learns to walk, although awkwardly. As the child grows the paralyzed side does not develop so fully as the other; the bones may be shorter; in the majority of cases contracture takes place to a greater or less degree; the arm may be flexed, the hand flexed, and the fingers drawn in. The reflexes are exaggerated; there is considerable motion in the parts, and the leg is never so much affected as the arm. In some cases there is very slight contracture; sensation is usually not affected; the electric reactions of the muscles are normal. In quite a proportion of these cases, sooner or later, epileptic convulsions occur, and the convulsive seizures may be confined entirely to the paralyzed side; but in the majority of cases there is a general convulsion, with loss of consciousness, etc., and the paralyzed side is most convulsed. In a considerable proportion of these cases there is imbecility. It is not uncommon to meet with posthemiplegic trembling, posthemiplegic chorea, and athetosis. The hemiplegic trembling may be present only when the muscles are put on the stretch, or it may be continuous during the waking hours; it is not made worse by motion, as in disseminated sclerosis, but is rather diminished or entirely stopped by voluntary efforts. The tremor is apt to be large and not so fine, steady, and rhythmic as in paralysis agitans. The choreic movements are mainly confined to pronation and supination of the forearm and to flexion and extension of the elbow-joint. The movements are disorderly and irregular and cease during sleep.

Athetosis is a condition of constant motion in the fingers

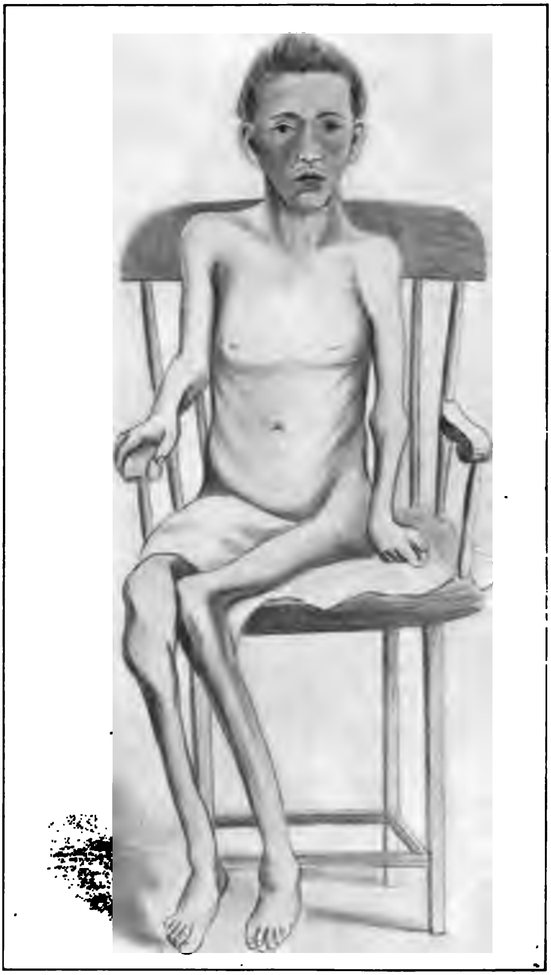

FIG. 42.—Spastic hemiplegia, left side, showing the contracture; arrests of development; epilepsy; and imbecility (Duryea).

and hand. The patient is unable to keep them in any fixed *position.* These patients may live for years, and die of some intercurrent disease, of which phthisis is one of the most common forms.

In children there is also observed a spastic paraplegia. The symptom may date from birth, but it frequently is not observed until some time afterward, when it is found that the child, whose legs are rigid, does not move them freely, and learns to walk late, when it presents all the symptoms of spastic paraplegia in the adult. There is also a bilateral spastic hemiplegia. This is nothing more or less than a hemiplegia on both sides, due to a lesion in the motor tract of each hemisphere, with secondary degenerations in the lateral columns. The subjects of this condition are usually imbeciles (Fig. 42).

Pathologic Anatomy.—It is claimed by Strümpell that a large proportion of these cases are due to an acute polio-encephalitis, analogous to the poliomyelitis of the anterior horns in children. This view is not accepted by all writers. The fact is that the lesions which give rise to this condition are not fully made out; they evidently depend upon a variety of pathologic changes. Meningeal hemorrhages, resulting from rupture of the vessels during a difficult labor, with perhaps a weak condition of the vessels, owing to nutritional disturbances during intra-uterine life, are undoubtedly a frequent cause of these cases occurring just or soon after labor, or as the result of injury in later life, or from fatty changes in the vessels during the eruptive fevers. The hemorrhage gives rise to convulsions and ultimate changes in the brain, with atrophy.

The loss of substance in some cases is very great, and frequently confined to the motor areas. A certain number of these cases are the result of polio-encephalitis.

Treatment is of very little use except to relieve the contracture by friction. About 70 per cent. of these children become epileptic.

Bibliography.—Osler, Monograph, 1889. Sinkler, Medical News, 1885. Sachs and Peterson, Journal Nervous and Mental Disease, 1890. Freud, Die infantile Cerebrallähmungen, Nothnagel's series, 1897.

INTRACRANIAL TUMORS.

New growths may occur either in the cerebral substance itself or external to it, in the intracranial cavity.

Etiology.—Often there are no indications as to causation. In children they often develop during or very soon after attacks of eruptive fevers, measles, scarlet fever, etc., evidently as the result of some disturbance set up in the cerebral substance, its envelops, or blood-vessels. They may develop secondary to tumors in other parts of the body; they are most apt to occur after tumors in the large cavities of the body—"secondary growths." Injuries are supposed to play a part in their development, and they may be the means of setting up the processes which give rise to the development of tubercular and syphilitic growths. Bramwell thinks they are more common in men than in women. Tuberculous tumors are most common in children and young persons; syphilitic tumors in early and middle life. Sarcomatous tumors may also occur in young persons.

Symptoms.—The general symptoms are headache, more or less severe, often not located; frequently referred to a part distant from the seat of growth; they are most often generalized. Tumors developing in the pia or dura are more apt to give rise to severe headache than those developing in the cerebral substance.

Vertigo occurs in almost all the cases, but it is transient; there may be associated with these vertiginous attacks sudden falling to the ground, without convulsions, and very temporary loss of consciousness.

Vomiting is a very constant symptom; it is sudden and explosive, especially when the growth is so situated as to cause pressure on the medulla.

Optic neuritis is found sooner or later in almost all these cases; it is important to make an ophthalmoscopic examination in all cases of suspected brain tumor, as optic neuritis may be present without any disturbance of vision.

Optic-nerve atrophy may be met with as the result of a primary neuritis in cases of tumors of long standing. In all these cases gradually failing vision with later complete blindness will occur. Three theories are offered to explain this optic neuritis: (1) Pressure and edema; (2) descending neuritis; (3) vasomotor irritation. It will be unnecessary to enter here into the explanation of these theories. There are additional symptoms which depend upon the location of the tumor: reference to the chapter on Localization in Diseases of the Brain and a study of the physiologic functions of the brain will make this clear. If the tumor is situated in the motor area, there may be localized spasm, with or without convulsions; subsequently, paralysis or paralysis coming on slowly. If in the visual centers, disorders of vision, etc. (Figs. 43, 44).

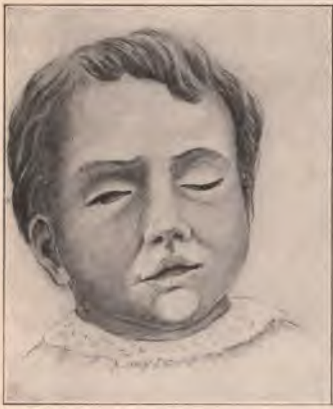

FIG. 43.—Ophthalmoplegia externa in a child three and a half years old from tumor in the midbrain, showing the double ptosis most marked on left side; personal case (Criado).

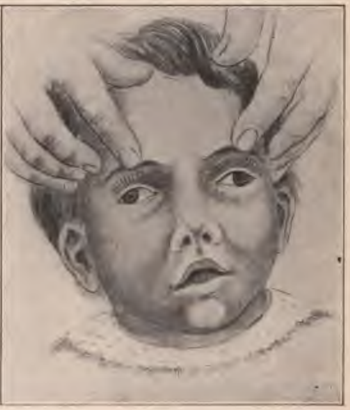

FIG. 44.—Showing the divergence of the eyeballs owing to paralysis of the internal rectus on each side. In the drawing it can be seen that the pupil on the left side is larger than on the right (Criado).

Tumors in the midbrain, in the neighborhood of the corpora quadrigemina, give rise to a combination of symptoms which have been described as ophthalmoplegia; it is true that this condition may depend upon pathologic changes other than tumor, such as lesions in the nerve nuclei or the periphery of the nerves involved. The symptoms are double ptosis and paralysis of the muscles of the eyeball supplied by the third nerve on both sides. These give the individual a peculiar appearance. The accompanying illustration will show clearly this condition, and for lack of space the student is referred to the articles given in the bibliography.

Diagnosis.—Gradual development of symptoms; headache, vomiting, epileptiform seizures, gradual onset of paralysis, according to motor areas involved; optic neuritis. If the tumor is at the base of the brain, there is gradual involvement of cranial nerves; if in the midbrain, progressive paralysis of the third nerve on both sides, etc.

Prognosis is unfavorable in all cases of cerebral tumor except in those which are clearly syphilitic.

Treatment.—In the syphilitic tumors iodid of potassium in gradually increasing doses. Iodid ameliorates the symptoms in those cases which are not syphilitic by diminishing the internal hydrocephalus which is very likely to occur in all these cases.

Trephining is now adopted in those cases which present clear localizing symptoms; it should not be thought of unless such symptoms are present.

Bibliography.—Bramwell, Tumors of the Brain. Mills, "Tumors of the Brain," Pepper's System of Medicine. Starr, "Ophthalmoplegia Externa," Journal Nervous and Mental Disease, 1888. B. Sachs, "Tumors of Midbrain," American Journal Medical Sciences, 1890. J. C. Shaw, "Ophthalmoplegia Externa," Brooklyn Medical Journal, 1891. Starr, Brain Surgery. Brüns, "Die Geschwulste des Gehirns; von Monakow, *ibid.*

ABSCESS OF THE BRAIN.

Etiology.—It is most commonly caused by disease and injuries of the bones of the skull and face.

Symptoms.—From injuries to the skull the symptoms are often more or less decided: headache, slight fever, chills, vertigo, nausea, and vomiting; there may be attacks of localized spasm in the face, arm, etc., according to the location of the lesion, and this may give place later to paralysis. If the condition progresses to a fatal termination, there are added slow pulse, delirium or stupor, dilated pupils, coma, and death; or the acute symptoms may subside, and the abscess run a chronic course, when a period may follow in which there are very few if any symptoms.

In abscess the result of disease of the bones of the ear, which is by far the most common cause, or of the nose or face, the symptoms are often obscure, and there may be no definite symptoms for a long time; when they are present, they are similar to those observed in abscess from injury.

In chronic abscess, headache, nausea, and vomiting, with occasionally fever, are the most common symptoms; they are like those observed in cerebral tumor; sometimes the terminal symptoms develop only a few hours or days before the fatal termination. If the abscess perforate the brain surface, there is added a purulent meningitis with all its symptoms. If it perforate the ventricle, there are almost surely convulsions; and if life is prolonged, a purulent basilar meningitis. If convulsions occur in cases of abscess, it may be localized or general. The convulsions and paralysis in these cases depend upon the seat of the abscess, and it is important if possible to locate them.

Abscess may occur anywhere in the brain. It is most common in the temporosphenoid lobe and cerebellum. In abscess of the cerebellum there is often a remarkable absence of symptoms, especially if located in one lobe, and death often occurs very suddenly from pressure on the medulla. I have several times observed as a symptom in these cases an unusual hunger, the persons eating much more than usual or complaining of hunger frequently; death followed in a few days or weeks.

Pathologic Anatomy.—The abscess may be of any size. The nerve elements are swollen, break down, forming a granular soft mass mixed with abundant pus-corpuscles and some blood; the connective-tissue elements may be increased; there is always an effort to encapsulate the abscess, and in the chronic cases the abscess wall may be of considerable thickness. In some cases of abscess from disease of the middle ear a narrow long sinus leads from the portion of brain over the diseased bone to the main abscess some distance away like the subterranean passageway into a mine. Around the abscess there may be considerable edema. Thrombosis, purulent or not, of the adjacent sinuses is often found.

Prognosis.—Unfavorable as a rule.

Treatment.—Medicinal treatment is useless. Trephining offers the only prospect of cure. For this purpose it is important that there should be localizing symptoms.

CHRONIC HYDROCEPHALUS (INTERNAL).

Etiology.—This is not clear. Hereditary predisposition appears to play some part; congenital syphilis is believed to have a causative influence; several children born in the same family may be hydrocephalic; traumatism to the mother may play a part in causing it. It may be caused by bad hygienic conditions or by tumors of the cerebellum and its vicinity pressing on the vena galeni. It usually begins just before or soon after birth; it may be preceded by an acute attack.

Symptoms.—Convulsions, rolling of the eyes about and crying, are often observed just after birth; later the head is noted to be growing larger; but frequently no special symptoms are apparent until the child is several months old, when the head is found to be growing out of proportion to the body; the fontanels remain unclosed, and the child begins to have a peculiar way of rolling the eyes about. Fluid gradually increases in the ventricles, widening the skull at all parts; the frontal bones push forward, and the head sometimes become enormous. The child is dull and stupid, and as the pressure becomes greater the optic nerves may be so injured that sight is much impaired or lost. The disease is almost always fatal, but the child may live a long time. When it remains slight and its progress is arrested, it is not incompatible with great mental power.

SECTION VI.

DISEASES OF TROPHIC ORIGIN USUALLY INCLUDED UNDER DISEASES OF THE NERVOUS SYSTEM.

DISEASES OF THE MUSCLES.

MUSCULAR DYSTROPHIES.

THIS is the name given to a class of muscular atrophies which are thought to be not of nervous origin, but are in the muscles themselves. Pseudohypertrophic muscular atrophy, the oldest known of this group, has always been considered among diseases of the nervous system, probably because of its resemblance to the group of myelopathic muscular atrophies and the suspicion that it also was due to some nerve changes.

PSEUDOHYPERTROPHIC PARALYSIS (Muscular Pseudohypertrophy).

Etiology.—Males are oftenest affected ; it occurs very often in several members of a family, but individual cases are also met with. In many cases there is no history of the ancestors having been affected. In other instances there is a hereditary transmission, and it is always through the mother, who may not be the subject of the disease herself. Children by two husbands but one mother have been known to develop the disease, thus showing an influence on the maternal side. It always begins very early in life ; it may be first observed when the child begins to walk.

Symptoms.—Impairment of muscular power, as shown by difficulty and awkwardness in motion ; often falls ; finds *difficulty* in going up a stairs—takes hold of the banister to pull himself up by; the muscles may present nothing unusual; later an enlargement of some of the muscles may be observed, and this is most frequently in the calf muscles; this may be made more apparent by atrophy of the thigh muscles. The extensors of the knee and the gluteal and lumbar muscles are often enlarged and the infraspinatus (Gowers). The lower border of the pectoralis and latissimus dorsi are often wasted; the muscles of the forearm are affected only in a small proportion of the cases. The weakened muscles cause difficulties and peculiarities in movement: the walk is swaying from side to side; there is marked lordosis in some cases; there is marked difficulty in rising from the floor or from a seat or going up a step where there is no rail to hold on to; one hand is placed on the knee and the body is pushed up (Figs. 45, 46). The shortening and contracture which may occur in some of the muscles give rise to abnormal positions of the body and extremities; there may be contracture of the calf muscles, so that the heel cannot be brought to the ground. Curvature of the spine may occur as the result of muscular weakness. There may be diminution of electric reaction, but no degenerative reaction. The tendon-reflex is at first normal, as the extensors of the knee atrophy, it is lost.

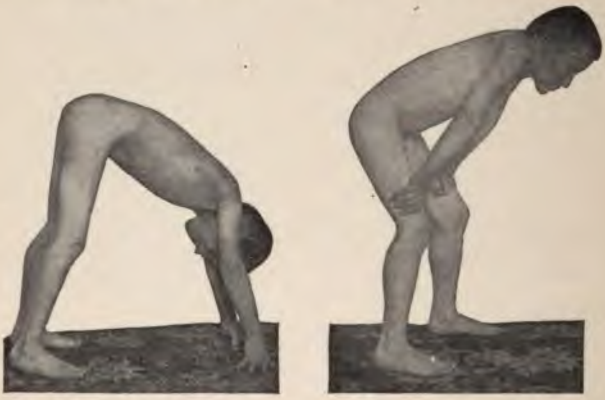

FIG. 45.—Method of rising from the ground in cases of myopathy (Church).

Pathologic Anatomy.—Atrophy of the muscles; absence and wasting of the fibers; the presence of large quantities of fat and connective tissue; the motor nerves have not been found diseased; and the spinal cord is normal. It is possibly a congenital defect in the construction and vitality of the muscle, so that it undergoes atrophic changes prematurely.

Diagnosis.—The age, the muscular hypertrophy in certain muscles and atrophy in others; the peculiar gait and mode of rising, etc.

Prognosis.—Not favorable; if the disease develops late, it is possible it may progress very slowly.

Treatment.—No treatment has been found beneficial. Gowers believes that muscular exercise has some influence in retarding the progress of the disease; massage and electricity may be of some service; if contractures occur, tenotomy may be resorted to for the relief of the deformities.

In the last decade there has been much activity in describing and dividing up into types, with special names, some of these muscular dystrophies.

Erb's Juvenile Atrophy.—In 1884 (second article) Erb described a muscular wasting which has since been known under the above designation. It occurs in early childhood as a weakness and atrophy of the muscles of the shoulder, upper arm, pectoral region, thigh, and back; the forearm and leg muscles are said not to be affected for a long time. The atrophy may be associated with true or pseudohypertrophy of some muscles. Fibrillary contractions and reaction of degeneration are said never to be present. There are no sensory *or vesical* disorders. The wasting is in the pectorals, trape-

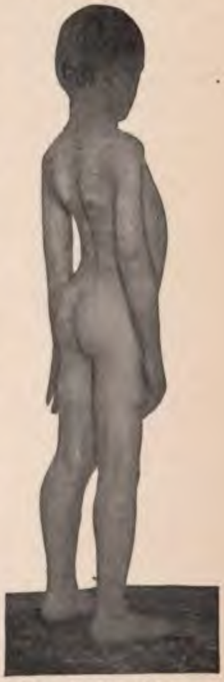

FIG. 46.—Position assumed after rising from the ground in cases of myopathy — cf. Fig. 45 (Church).

zius, latissimus dorsi, serratus, and rhomboids, as well as most of the upper-arm muscles, while the deltoids, supraspinatus and infraspinatus are either hypertrophied or normal for a long time.

More recently a variety has been described by Landouzy and Déjérine—the Landouzy-Déjérine or facioscapulohumeral type. It begins, as a rule, in early life and in the muscles of the face, and gives rise to a characteristic thickening of the lips which they have described as "tapir" mouth; later the atrophy affects the muscles of the shoulder and arms, supraspinatus and infraspinatus, and subscapularis; flexors of the hand and fingers remain normal; exceptionally it may begin in the muscles of the shoulder and arms or even in the lower extremities. It is distinctly hereditary; fibrillary contraction and reaction of degeneration are never present.

A variety has been described by Leyden as hereditary progressive muscular atrophy.

Heredity is the prominent cause in all these cases. The disease begins as a weakness and wasting in muscles or muscular groups at an early period of life. The tongue, muscles of mastication, and pharynx are never affected. The electric irritability may be diminished, but there is no reaction of degeneration. Some shortening of the muscles has been observed, especially of the calf muscles; deformities may occur, as in progressive muscular atrophy. Its course and duration are variable; it may remain confined to one part or extend to others.

(Brouardel and Gilbert, Traité de Medécine, vol. x., 1902.)

ACROMEGALY (Gigantism).

In 1886 Pierre Marie first gave a description of this disease from a study of two cases in the wards of the elder Charcot. Since then contributions have been made to the subject by Marie and others. A summarized account of the condition only will be given here from Marie's articles.

Acromegaly is characterized by a remarkable enlargement of the extremities, hands, feet, and head. The hands are enormous, their form is regular, but their width is out of proportion to their length; the fingers present a "sausage-shaped" form; there is often swelling of the articulations of the first and second phalanges, with a certain flattening of the fingers in the anteroposterior direction. The palmar lines are exceedingly marked and bordered by large folds. The hypertrophy affects not only the skeleton, but to a marked degree the soft parts; it is especially developed at the upper part of the hand and its ulnar border. The nails are flattened, rather widened, and their lateral borders are sometimes curved up. The feet are enlarged; on their external border the mass of tissue forms an enormous pad. The malleoli are generally increased in size; to a less degree the head of the fibula and the upper extremity of the tibia; otherwise the size of the legs is not much increased. The knees often appear prominent, owing to increase in size of the patella and condyles of the femur. Diameter of the thigh unchanged. The cephalic extremity is increased in size and especially marked in the prominent parts of the face. The cranium is but little altered in shape and size; the face appears elongated vertically; the forehead is usually rather low, with marked prominence of orbital arches (due especially to dilatation of the frontal sinuses). The eyelids are often elongated and thickened; their tarsal cartilages may be hypertrophied. The nose is increased in all its dimensions—it is thickened; the cheeks are generally flattened and elongated; the cheek bones are prominent and bulky. The increase in the size of the lower lip contributes greatly to give the patient the remarkable physiognomy which makes him recognizable at a distance and at a glance. The lip is prominent and strongly everted. The upper lip may be a little thickened, but not *comparable* to the lower. The chin projects markedly down-

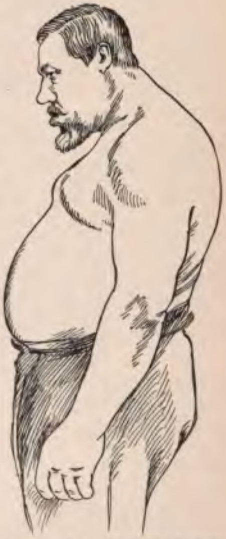

FIG. 47.—Cervicodorsal curvature of spine; chest and abdominal distortion in acromegaly (Marie).

ward and forward; it is large and massive; the lower jaw is increased in size, and as the upper jaw does not undergo the same modifications, a very marked degree of prognathism often ensues. The tongue is of large dimensions, and in some cases double its normal size; its shape remains perfectly regular; its increase is in all directions. These modifications of the tongue and lips sometimes interfere with articulation. The ears are sometimes increased in size. There is a marked kyphosis in the upper part of the dorsal region; the patient's head is buried in his shoulders in consequence. The vertebræ are very much hypertrophied. The neck is short and thick. There is an enormous increase in the thorax. Headache is present, and there are pains in joints in a certain number of cases. Mental hebetude or dulness is usually present. Many museum freaks—giants, etc.—are such cases (Figs. 47, 48).

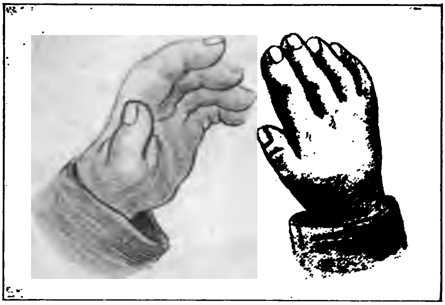

FIG. 48.—Showing the shape and size of the hands in acromegaly (drawn from an illustration by Marie).

Pathology.—As yet no definite pathogeny can be given. Many cases seem associated with enlargements of some portion of the hypophysis cerebri. (Harlow Brooks, "Acromegaly," Archives of Neurology and Psychopathology, 1901.)

MYXEDEMA.

Myxedema in the child and in the adult are undoubtedly the same disease. The endemic cretinism which has *been known for a* long time, and which is almost entirely confined to certain localities in Europe, especially Switzerland and France, although having a resemblance to myxedema, is probably a very similar condition. Myxedema in the child was first described by Curling in 1850 under the name of "sporadic cretinism." The disease is usually observed very early in life—in fact, in some cases appears to be present from birth.

As the child reaches the age of one or two years the parents or friends observe that mental and physical growth is not so great as in other children of the same age; the child does not learn to walk at the age it should; perhaps even at this time there is observed an unusual puffiness or swelling of the face.

Later the child presents all the characteristic symptoms—a swollen appearance of the face, especially about the eyelids, also of the neck, hands, and to a less degree of the legs. The lower extremities are small and weak. The body is proportionately large, the abdomen especially so. The skin is coarse and dry; the hair is coarse and scanty. There is some defect in the circulation and nutrition, shown by the coldness and bluish appearance of the extremities. The tongue may be large; the lips are thick. There may be a tumor-like enlargement in the region of the shoulders and neck. The bowels are constipated, and the appetite is variable. The patients are pale and often present a wax-like appearance. The body is dwarfed. The facial expression is old and often ugly.

Mentally the children are dull and apathetic, are often unable to say more than a few words, and take little interest in their surroundings. They are usually disinclined to move. There is an arrest of development in the sexual organs in most cases. The degree of mental defect varies very much, and it is the same for the physical symptoms.

Pathology.—The affection is apparently the result of an arrest of development or disease of the thyroid gland. This gland has been absent in cases in which autopsies have been made.

Diagnosis.—In well-developed cases there is no difficulty in diagnosis. The dwarfed stature, the swollen appearance of the face, and the mental hebetude will direct attention to *this condition.*

Myxedema in the adult was first described by Sir William Gull in 1873, in an article entitled "On a Cretinoid State supervening in Adult Life in Women." In 1877 Ord suggested the name myxedema, because in one of his cases a quantity of mucin was found in the subcutaneous tissue. The disease begins in the adult about middle life; it may, however, occur in advanced life. The symptomatology is similar to that of the disease in children: hebetude, drowsiness, disinclination for mental and physical exercise, swollen, puffy appearance of the face and neck, a slight flush on the cheek, which varies very much in intensity in different cases; the lips are swollen; the tongue may be large; the eyelids are swollen and present a baggy appearance; the skin is dry and the hair may be coarse. The patients are slow in their movements and mental actions. The secretions are diminished. Delusions and hallucinations may occur in some cases. The temperature may be subnormal, the victims suffering from cold even in warm weather. The nails may become brittle, and the teeth decay.

Pathology.—Degeneration and atrophy of the thyroid are found in these cases.

Prognosis.—Under treatment great improvement takes place. The treatment must, however, be continued for a length of time and at intervals in the future.

Treatment.—Sheep's thyroid in some form must be given. The fresh glands were at one time administered; more recently a glycerin extract of the gland has been given hypodermically. The desiccated gland given by the mouth has, in my experience, been quite effective; 2½ grains to 5 grains once every other day is a sufficiently large dose to begin with; it may be increased to 5 grains a day if necessary. The remedy can be mixed with the food in the case of very young children. Diarrhea, excitement, rapid or weak pulse, vomiting, and general weakness show what are believed to be toxic effects of the thyroid. The dose should be diminished on the appearance of these symptoms. Recently there has been introduced a preparation called "iodothyrin," containing the active principle of the sheep's thyroid.

THOMSEN'S DISEASE.

This condition deserves a passing notice here. It is not frequently seen. It was first described by Thomsen, who was himself a sufferer. It is often inherited, and may appear in several members of a family. It is characterized by stiffness and rigidity of the muscles as soon as voluntary motion is attempted, and it may be so great as to prevent all motion. If they attempt to take hold of any article, the muscles contract very slowly, but when the object is once grasped, it is not readily released, as they in turn relax very slowly. Rest appears also to make the muscles stiff, and they experience great difficulty in beginning a voluntary act. In some cases the muscles of the back are affected and there is a spasmodic lordosis; the movements of the tongue may be interfered with, and a patient of Ballet and Marie found that if he turned his eyes upward they became fixed and he had difficulty in changing their position.

Its place in nosology is not definitely ascertained. It may be best grouped with hysteria—perhaps with the myoclonias and convulsive disorders.

SECTION VII.

DISEASES OF THE MIND—THE INSANITIES.

PSYCHIATRY is the study of the defects and modifications of the brain and brain action. Insanity is a word, as a word, that defies definition in a medical sense. It is a vast conglomeration of conditions which are adjudged abnormal by psychiatry students of the times. The conditions of life are constantly modifying, and must have their influence on the mental life of the individual, so that many acts which were at one time considered normal may now be considered the result of an abnormal brain action, and, conversely, many current ideas of the present may at some future time be adjudged insane. From the jurist's point of view the question of insanity means only the attitude of mind concerning certain legal conditions, such as property, life, responsibility, etc.

From a strictly pathologic standpoint all psychoses are the result of some form of disease or alteration in the human brain cortex. This process may or may not be a recoverable process. It may be extremely slight. It may be a defect of such extent as to render an individual an idiot.

As to the classification and the limitations of insanity, different view-points are found, and necessarily, since the study of normal mental life is in its infancy.

At least four steps in the psychic process should be considered in the study of the insanities: Feeling, perception, idea association, and acts. Modifications of feeling constitute the first steps in the psychic processes. Such modifications are present in many of the insanities. Hyperesthesias and anesthesias are very common in the mild psychosis, hysteria, and hey constitute marked features in the neurasthenic insanities, n melancholia, and in certain delirious, maniacal states.

Changes in the feeling tone are particularly common in the melancholias. Hyperalgesia and hyperhedonia, hypalgesia and hyphedonia, are frequent. Synesthesia, hallucinations, and illusions are all affections of feeling (Empfindung).

Modifications of perception (Vorstellung) and of related memory constitute the foundations of many delusional states.

It may be well, at the beginning of this section, to state briefly what are understood by a few of the terms which are in constant use in mental diseases. They are not definitions, but explanations. It is very difficult to define some of these terms to suit everybody. If we understand their application in mental diseases, that will suffice for the present.

Hallucinations of hearing, vision, taste, smell, and tact are quite common in the insane, and the frequency with which they are present is in the order in which they are here given.

Hallucinations are the perception of objects, sounds, tastes, smells, etc., when they do not really exist. If a person says he sees men outside and there are no men there, he has a hallucination of vision. If he says he hears a child shrieking when there is no child shrieking, he suffers a hallucination of hearing.

A person may have hallucinations and yet be sane; mentally he can correct the erroneous perception.

Illusion is the misinterpretation of the character of an object which is really perceived. If a man sees a piece of clothing hanging on a chair in his room and says it is a bear, or if, seeing a lamp-post, he says it is a man, he is suffering from an illusion.

Delusions are false ideas the result of disturbances in reasoning. If a man says he sees men outside his house with guns, when no men with guns are there, he has a hallucination of vision. If, now, he says, contrary to the evidence of others, that they are there, that they are coming in to shoot him, he has a delusion based upon his hallucination.

But he may also have these erroneous ideas without the hallucinations; he may, from a general disturbance in his reasoning faculties and vague feelings of distress, say that he has committed some crime which he is unable to give any evidence of, and is to be hanged to-morrow; he suffers from a *delusion.*

CHAPTER I.

HYSTERIA.

THIS is a morbid state of the nervous system in which the clinical manifestations present the most wonderful variety, and in a remarkable manner simulate organic disease; there is often increased physical irritability. It is often manifested by neuralgic pains, hyperesthesias, hallucinations, and convulsive and paralytic phenomena. It may be regarded as a psychosis.

Etiology.—Heredity plays a most important part in its production. There may be a direct transmission of hysteria from the parent to the child, or there may be other nervous manifestations in the members of the family and its branches, such as epilepsy, chorea, neuralgia, insanity in some of its phases, or some other nervous disorder. It occurs more frequently in women, but it is much more common in men than is ordinarily believed; it occurs in boys and girls at a tender age or about the time of puberty. Briquet found that one-eighth of his cases were in children under ten years of age. Anything which lowers the general tone of the nervous system may give rise to it in these oversensitive, predisposed persons. Hemorrhages, severe illness, poor food, anemia, overwork in occupations which are not congenial, anxiety, fright, jealousy, disappointments of all kinds, make a profound impression; so does an education which fosters and stimulates this inherited instability. The enforced social restrictions of women, which they often inflict upon their young children, with lack of proper exercise for physical development and an artificial and premature education and habits heighten this predisposition. Accidents are a frequent cause of the first appearance of the condition, as has been clearly pointed out by Charcot. The disease may, at times, occur in young girls who have witnessed attacks in others.

Symptoms.—In the understanding of the clinical picture of hysteria it is essential to bear in mind that there are two classes of phenomena. These have been termed the *mental stigmata and the mental accidents.* The stigmata are anesthesias, *amnesias, abulias,* motor disturbances, and modifications of character. These are the cardinal symptom-groups that characterize the mental state of the hysteric.

In addition any or all of the mental accidents may be noted. These are, for the most part, suggestibility and subconscious acting, fixed ideas, attacks of ecstasy, automatism, tics, etc., somnambulism and deliriums. These constitute important corroborative evidence of the hysterical state. They are not found in all hysterics, but are very common.

Hysterical persons often complain of some of the symptoms found in neurasthenia—neuralgic pains in various parts of the body and hyperesthetic areas about the abdomen, chest, or back. A frequent location of them is in the neighborhood of the ovary, mammary gland, etc. There may be anesthetic patches in various parts of the body, or there may be complete hemianesthesia, which is associated with anesthesia of the mucous membranes. The special senses on that side are involved—sight, taste, and hearing. There may be restriction of the visual field for color. The degree and completeness with which these manifestations present themselves vary.

There may be irritations of the bladder and urethra. Patients often complain of pain in the joints, which may be mistaken for joint disease, especially if there happens to be some swelling. Sir Benjamin Brodie called attention to the frequency of these hysterical joint troubles.

In some cases of hysteria the senses are exceedingly acute. Persons notice odors which are not perceptible to others; they are often made very sick by odors which have no influence on normal individuals. On the other hand, they may have a liking for odors and substances disagreeable to other persons; these perverted senses are well shown in an abnormal taste, in eating soap, slate pencils, small chalky or soft stones, etc. The hysterical manifestations in some are simply an exaggeration of their emotional state; they laugh and cry without cause. When there is a more or less profound attack, there are likely to be present a number of hysterical manifestations. In the anesthesia which occurs in these cases, as a rule, the sensibility to pain is alone overcome; the other forms of sensibility are normal; occasionally tactile sensibility is disturbed, and the muscular sense may in some cases be abolished. The anesthesia may affect the mucous membranes of mouth, pharynx, and nose, and in consequence the reflexes of the parts are abolished. The secretions may be diminished or arrested.

Spasmodic convulsions and paralytic phenomena may occur. The spasmodic attack may be of great variety: it may be rhythmic; it may simulate the trembling of organic disease; be confined to one member or involve the entire half of the body and be hemiplegic in type; it may be coarse, as in disseminated sclerosis; or fine tremor, as in paralysis agitans; or may simulate the prehemiplegic and posthemiplegic trembling of organic disease; it may occur in any muscle or group of muscles in the body; it may manifest itself as contracture, which may be intermittent or last continuously for months and years. Professor Charcot has pointed out the permanency of these conditions and the obstinacy to treatment which often characterize them. These contractures may be confined to the masseter and other muscles in their neighborhood, causing trismus. Spasms of the glottis may take place, giving rise to severe dyspnea; or of the pharynx, causing difficulty in swallowing. Globus hystericus is rather a constant symptom, but not so frequent as it is often thought to be. Persistent and severe vomiting often occurs, but the nutrition rarely suffers materially from these attacks. Retention of urine is frequent, owing to spasm of the sphincter, and the catheter may have to be used for months.

Paralysis occurs in these cases; it is variable in distribution, and may come on suddenly after a convulsive attack or without it; it may be flaccid or associated with contracture; it may come on slowly; it may be confined to one limb or be hemiplegic in type. These paralytic phenomena may disappear in a short time, to occur again in the same parts or in some other parts after the lapse of a few months.

These persons are impressionable—easily affected by pleasurable or painful impressions, and there is often a morbid craving for sympathy and attention. This morbid state may present itself in persons who had previously not shown the least sign of nervous impressionability. They may show a tendency to moral perversions: lie, steal, quarrel with and intrigue against their own family. They often form attachments to, and dislikes for, persons without obvious reason, and as frequently change them. They often manifest an aversion to certain creatures, such as frogs, spiders, mice, cats, etc. Others show a desire to deceive, often for deception's sake; or to make themselves the objects of curiosity and wonder. To this end they drink urine and eat excrement, which they vomit up, or they pretend that urine passes through the navel or other part of the body; or they may inflict injuries upon themselves which they pretend were inflicted in some other way; or they may pretend that they had attempted suicide. They would have us believe they fast.

Others are painfully depressed; they are sad, have forebodings, or are compelled to the performance of certain acts. On this border-line we approach the hysterical insanities, on the one hand, and the imperative conceptions and neurasthenics, on the other. A record of these morbid manifestations in hysteria would fill a long chapter.

Convulsive Seizures.—Hystero-epileptic attacks in their greatest severity are not apparently of so frequent occurrence here as in Europe, especially in France; but this may be due to the large hospitals for chronic cases where patients are massed together. These convulsive seizures often are preceded by a feeling of general discomfort or of hallucinations of vision and hearing, such as the cries and sight of wild animals. They are usually sudden, but they may be preceded by an "aura," globus hystericus, singing in the ear, or haziness in the visual field. Respiration is spasmodic; consciousness is obscured; the convulsion may be similar to that of epilepsy of moderate severity. In some cases the body is thrown into all sorts of contortions and attitudes. An extreme opisthotonos may be present, the body being bent backward, resting on the head and heels. Or there may be various contortions of the body, which are fixedly maintained for some time. The legs and arms are thrown about. The persons make gestures and noises. They sometimes have religious ideas, which have an influence over the attitudes assumed during the convulsion; or they have ideas of demoniacal possession, which give rise to hideous facial expressions.

One phase of this condition deserves mention here, and it is the association of hysterical symptoms with organic disease.

This association often leads to great difficulty in diagnosis even by experienced clinicians.

Prognosis.—From the milder forms, recovery is the rule. In the graver manifestations of the disease, and when there is a strong neuropathic tendency, there is every probability that the person will pass from one hysterical manifestation to another.

Treatment.—In those cases—and they are not uncommon—in which there is deterioration of the physical health, tonics and nutritious diet should be given. Hydrotherapy is of benefit, not alone by improving the nutrition, but also by its influence on the mental state. A large number of drugs have been recommended, but they are all exceedingly uncertain in their action, apparently giving a result at one time and entirely failing in the next. The convulsive attacks may at times be stopped by the cold douche to the spine or by a hypodermic injection of $\frac{1}{20}$ of a grain of apomorphin or $\frac{1}{50}$ of a grain of hyoscin hydrobromate. Isolation from the family circle is of the utmost importance in the treatment of these cases. Every effort should be made to discover the emotional disturbance, the psychic shock, which has produced the hysterical attack. It is sometimes very difficult to obtain this information, as it may be known only to the patient, and he will not often reveal it. It has been suggested that this information can be obtained by hypnotizing the person. There is no disease the treatment of which it is more difficult to describe. Much depends upon the ingenuity and thoughtfulness of the physician in devising expedients for influencing the mental state of the patient. Suggestion therapy gives by far the best results, but the great difficulty is that good results are rarely permanent.

Bibliography.—Charcot, Leçons sur les Maladies du Système Nerveux, tome 3. Jolly, Hysteria, Ziemssen's Cyclopedia of Medicine. Seguin, Hysterical Symptoms in Organic Disease, Opera Minora. Putnam and Walton, Journal of Neurology, 1884. Janet, Mental State of Hystericals, Putnams, 1902.

CHAPTER II.

IMPERATIVE CONCEPTIONS.

UNDER this head are included a variety of abnormal mental states. The patients may be hysterics, neurasthenics, or they may be insane. They reason and think correctly, recognize the absurdity of their ideas, and often occupy important positions in life. They are considered under this head for purposes of convenience, representing in a large number of persons certain mental characteristics. They are most frequently met with in private practice or at the clinics. The condition is manifested by a bursting into consciousness of ideas or words which have no connection with the existing train of thought; it surprises, confuses, and distresses; it is beyond the control of the individual; no effort prevents the sudden appearance of these morbid ideas. They are not infrequently connected with the curious and fanciful ideas of the person. It is always found in persons of a neuropathic inheritance, and there may or may not be evidences of degeneration.

Some patients always feel an irresistible desire to tell persons they see to do some harm; if they see a child, to tell it to break things or set the place on fire. Ruffianly looking men give rise to the desire to tell them to kill or to do some harm. These imperative conceptions are often associated with a feeling of doubt as to their having performed some act; thus they often doubt if they had told these persons to do harm. Under this general head have been described a variety of morbid states, such as *folie du doute*, *folie du toucher*, mysophobia (fear of contamination) of Hammond, agarophobia, claustrophobia, etc.

In its simplest form this condition is sometimes observed in neurasthenics, and perhaps women suffer from it oftener than do men; it occurs in persons who inherit a neuropathic constitution—who have evidences of degeneration; but it may be found in persons who present no evidence of degeneration. It is brought on by illness which lowers the general nutrition, loss of blood, anxiety, privations; gastro-intestinal disorders play an important part in setting it up. The disorders of the intestinal tract have a most wonderful influence in disturbing the nervous systems of these persons. In its simplest form it is manifested by a dread of fatal disease which they doubt their physician's knowledge of, or they doubt the propriety of his treatment. They watch with anxiety all their functions and sensations, and interrogate their physician and friends. It is constantly manifested by a dread of going out-of-doors alone; they fear they will fall in the street, or have some kind of an attack, or that something will happen to them, they cannot explain what. The moment they attempt to go out this imperative idea comes upon them; they become anxious, tremble, and perspiration breaks out; they are flushed, feel hot, and faint; a feeling of suffocation and weakness of the legs comes over them. They are conscious of the absurdity of the idea; many try to overcome it by going out; in others the idea and dread are so strong that the moment they attempt to go out this idea, with all its accompanying sensations, comes upon them. Others have a dread of crossing the river or traveling on a railroad train; an idea comes to them that something will happen, when they are at once thrown into terror; one of my patients always said he became "panicky." Cold perspiration would break out upon him; he was in terror until off the car; he knew the absurdity of the idea and dread, but could not overcome them. Or a woman may have the idea that the needles she uses will do some harm. A painter fears that in some way he has poisoned a well. These imperative ideas may be of a homicidal nature. A young girl, at the sight of knives, has an imperative conception to kill her mother; she is perfectly conscious that it would be unnatural and a crime; she tries to overcome it, but is unable; this throws her into a state of distress and anxiety in which she cries and begs to be helped.

Or the imperative ideas may take the form of questioning on religious and metaphysical subjects, such as "Who am I?" "Who is God?" "What am I doing here?" "Am I alive?" etc. Or they may be of a vulgar character, and these are frequently associated with religion. In devotions the idea of the sexual apparatus of the Virgin Mary suddenly arises and constantly recurs. To a good Roman Catholic this is a most terrible thought. He tries to overcome it, consults his priest;

but the idea constantly recurs in spite of his efforts. A well-marked form of this state is the mysophobia (*folie du doute; folie du toucher*). It usually begins, in a well-marked case, with doubt as to their having performed some act properly; this is soon followed by a dread of dirt—contamination. A characteristic of these cases is frequent washing of the hands, with the imperative idea that they are dirty. Once washed, they doubt their being clean; this leads to another washing and repetitions. The dread of door-knobs, knives, objects made of metal, is very common with these sufferers. They are perfectly conscious of the abnormality in their mental states, but are powerless; all their endeavors to correct these conceptions are ineffectual; they only become confused, suffer headache, and are thrown into such a state of anxiety that they usually abandon all efforts and resign themselves to their fate.

Another class of cases, not frequently met with, however, are the sufferers from perverted sexual instincts. It is an anomalous sexual state in which men are attracted sexually toward men, and women toward women. It is an imperative impulse; it occupies the thought of the individual; they recognize their abnormal state and often lament it, while others defend their actions and perverted feelings. They have no pleasure in the association with those of the opposite sex. They may be unable to have sexual intercourse; if they can, it is not accompanied with any gratification. They have erections only in the presence of men. They may gratify their perverted instinct by contact with the object of their love, or by mutual onanism, or by sodomy, but this is rare. They take great pleasure in watching the naked forms of their own sex.

They may have all the appearance of normal individuals. Others have a feminine appearance, when they are really men; are fond of puerilities, of things which interest women, have a special aptitude for millinery, etc. The relation of the history of one of these individuals will best illustrate the condition; it is reported by Krueg:

N. belonged to a neuropathic family; his mother was hysterical, a sister similarly affected, and a brother shot himself. *When six* years of age the sight of naked men in a bath gave him peculiar pleasure. From nine to fourteen years was nervous, the result of a fright, and was sent into the country on account of his delicate health. Learned the practice of onanism from his school-fellows. At this time conceived an extravagant fondness for one of his "friends," in which, at last, sexual desire and jealousy came to play the same part that they ordinarily do in love affairs. Found no pleasure in the sports of his comrades. Later, devoted himself successfully to millinery: ladies' bonnets were his particular specialty, and he possessed singular taste in designing new shapes and trimmings.

Was thirty-three years of age, in good pecuniary circumstances, had no desire to marry or have children. Had an insuperable abhorrence of sexual connection with women. Continued to practice onanism alone and with other men. Confirmed the statement made by others that individuals affected with this abnormity are able to recognize one another. His imagination would dwell on the male sex only, although he did all that he could to direct it to the opposite sex. Men appeared to him in his dreams. He resolved to leave off all intercourse with men, but since the resolve had experienced a constantly increasing mental irritation, as he could not gratify his stronger sexual appetite. Complained of various nervous sensations; had inherited the fear which his mother had of anything pointed, such as pins. At times lost the power of controlling his thoughts; was unable to banish certain ideas (Zwangvorstellung). For instance, during the mass for his dead brother was compelled to think of a combination of the Host and the anus of a dog—a horrifying thought to a believing Catholic like himself. Patient was of medium size, with normal genital organs, a sparing growth of beard carefully shaven, affected in dress and demeanor; speech and gestures theatrical.

The clinical picture in these cases of perverted sexual instinct is exceedingly varied and curious. Krafft Ebing, one of the best writers on this state, summarizes the subject in the following manner:

(*a*) Congenital absence of sexual feeling toward the opposite sex, at times even disgust of sexual intercourse.

(*b*) This defect occurs in a physically completely differentiated sexual type and normal development of the sexual organs.

(*c*) Absence of the psychic qualities corresponding to the anatomic sexual type, but the feelings, thoughts, and actions of a perverted sexual instinct.

(*d*) Abnormally early appearance of sexual desire.

(*e*) Painful consciousness of the perverted sexual desire.

(*f*) Sexual desire toward the same sex.

(*g*) The sexual desire remains purely platonic or finds gratification in mutual onanism or in feeling of the object of the affections. Often there is self-pollution, but for the want of something better.

Bibliography. — Krafft-Ebing, Psychopathia Sexualis. Havelock Ellis, Sexual Inversion. Moll, Schrenk-Notzing, etc.

CHAPTER III.

GENERAL NEUROPSYCHOSES.

THERE are psychoses developed on a markedly neurotic substratum, and are characterized by functional nervous disturbances. The group, as outlined by Kraepelin, contains the epileptic, hysterical, and traumatic insane states.

EPILEPTIC INSANITY.

The epileptic state has already been described. Insanity may follow the epileptic convulsion—postepileptic insanity. It may precede the convulsive seizure. It may take the place of the convulsive seizure, or it may terminate in dementia.

After one or more epileptic seizures there may be a sleep of short duration, which may be followed by a state of light stupor during which, or following it, there is a state of fright and terror, with disturbance of consciousness more or less complete. The stupor may be prolonged for days; it may be deep, or only a confused dazed state in which the patients mutter to themselves, repeat words, move about from side to side in a restless manner. They may be constantly asking *questions* and making complaints or demands. They have difficulty in speaking. Speech is indistinct and hesitating; their movements may be slow, awkward, and trembling. Consciousness is profoundly disturbed. After the attack has subsided they may indistinctly and in a fragmentary manner recall certain things which have occurred; or there may be a state of anxiety, irritability, and excitement (postepileptic delirium) the result of hallucinations of a terrifying nature. They are thrown into a state of wild excitement and fury, in which they break objects; injure themselves and others; the face is congested, eyes and conjunctiva injected, facial expression that of terror and fury, eyes more or less fixed and wild; arteries throb. At the end of a few hours or a few days they quiet down gradually and sleep, after which there is a light state of stupor or confusion. They complain of headache, and of feeling bad and tired; during the excitement they neither eat nor drink; now they begin to take food. The hallucinations are terrifying: they see God, the heavens opening, angels and devils, hear music or terrifying noises. The violence is sudden and furious, and directed against persons and objects around them with indifference; a parent kills his child by suddenly dashing it against the wall (a case which came under my personal observation). They may mutilate themselves. In other cases the maniacal seizure may precede the convulsion; they are irritable, strange, restless, asking innumerable questions, and making demands; become more and more agitated; this is followed by a convulsive seizure, after which they may pass into a sleep, followed by a confused state and recovery of their former selves, or, after the convulsion, there may be the wild excited state, as in cases of postepileptic delirium. Or the convulsive seizure may be replaced by a maniacal attack similar to the postepileptic delirium; they may have all the terrifying hallucinations or not; they sing, shout, break up everything about them.

There may be maniacal attacks which last weeks and months with marked disturbances of consciousness, illusions, and hallucinations of a distressing character, marked ill temper, fault-finding, with religious ideas, a disposition to acts of violence, and a tendency to end in dementia.

There are also seizures, more or less sudden, and these are not succeeded by convulsion, in which the person is seized with dread, terrifying ideas, a dazed state of consciousness, with impulses to suicide or acts of violence to others, and there is a disposition to wander away from his residence; it is of short duration—a few days.

There are also seizures, very much like petit mal, in which there are sudden and temporary confusion, disturbed consciousness during which they perform apparently voluntary motor acts (automatic acts), such as attempts at suicide or homicide, thefts, setting fire to places, rape, etc. There is complete amnesia. They are of short duration.

During the convulsive seizures there are elevation of temperature and increased pulse-rate.

Epileptics are often profoundly egotistic; they think only of themselves, and observe minutely all the acts of their vegetative life; they are indifferent to those about them; they are irritable, easily offended, and the least opposition to their wishes gives rise to vague ideas of persecution. On the other hand, they are often easily made sociable and pleased by small attentions and acts of kindness or a few kindly words. They are frequently excessively religious, speak only of God and religion, sing hymns, and read the Bible. This excessive religious feeling may precede a maniacal attack. They are often defiant, quarrelsome, and fault-finding. In the majority of these cases they gradually pass into a state of dementia.

Treatment.—These epileptic insanities are best treated in asylums. In the maniacal attacks it is necessary to isolate them; if the maniacal excitement is prolonged, so as to cause exhaustion, narcotics must be given—chloral is the best. The treatment otherwise is the same as epilepsy, but usually less successful. In the maniacal seizures which replace the convulsive attacks the best results are sometimes derived from the use of full doses of bromid of sodium or potassium.

HYSTERICAL INSANITY.

The hysterical temperament is its foundation; it is very variable. There is an extreme change of state; it is much *influenced* by disturbed conditions of the sexual apparatus, feebleness, physical and psychologic; the reflexes are overactive: they are thrown into convulsive states with great ease; they are emotional and imaginative; impressionable; there are often sudden intellectual confusion and incoherent ideas; they are fond of being eccentric and attracting attention; their behavior is such as they think most calculated to make them interesting. They are egotistic; they neglect their own occupations to engage in useless benevolent work. Others are disagreeable, quarrel with their friends, and abuse their families so that they cannot live at home. They are subject to intense hallucinations of a fanciful character. They have either excessively strong sexual desires or the reverse, and are sometimes given to self-abuse. They exaggerate their pains, and accuse those about them of unkindness; they pretend resignation to their state. They are usually unfavorable cases for recovery.

The traumatic neuroses have already been considered.

CHAPTER IV.

INTOXICATION PSYCHOSES.

THESE would include the deliriums of many of the acute intoxications, such as atropin, cannabis indica, morphin, lead-poisoning, alcoholic poisoning, and the thyroid insanities, as seen in myxedema and cretinism.

ALCOHOLIC INSANITY.

There is a peculiar neuropathic state which in some persons gives rise to a craving for stimulants, especially alcohol—such as the dipsomaniac, who periodically is impelled to take his first drink, and then suddenly plunges into the depths of alcoholic intoxication, to emerge from it somewhat quickly after several days or months, with a period of freedom and abstinence, or in the case of a person whose whole character is irritable, disagreeable, a burden to himself and those about him; an increase in this irritable state precedes an imperative desire to drink. But all patients are not of this type, but may be individuals who, with inducements, have acquired a habit of drinking for years, have thus lowered the tone of their nervous organization, weakened their will-power, so that they no longer control themselves. Their organs are all more or less diseased; fatty changes, increase of connective tissue, especially in the liver and kidneys, have occurred. There is no relation between the amount of alcohol taken and the mental symptoms, as persons with a neuropathic constitution bear alcohol very badly, and a comparatively small quantity taken by them will set up a train of morbid mental symptoms not found in others.

After a few days or weeks of alcoholic excess hallucinations, delusions, and illusions of a terrifying character are developed. Voices threaten and taunt the patient. He may have delusions that he is to be killed or injured. He thinks he sees men coming after him. At night he hears numbers of threatening voices of men and devils outside his house trying to get in; he has illusions, in that he mistakes the lamp-posts for men with guns, or a wagon for a hearse to put him in; the objects in the room may be mistaken for men, or he may have vivid hallucinations of vision, seeing numbers of men outside. He becomes intensely terrified and may shout for help, attempt to hide, or prepare to defend himself. Such a man is dangerous.

Others are depressed and think they are about to die. They hear voices calling them vile names; in women, accusations of prostitution; threats to kill them, or turn them out of their houses; or the delusion that they have some loathsome disease. They have a marked tendency to injure themselves by mutilation; sometimes the most terrible, such as putting their heads in a hot stove or burning themselves over the abdomen and penis with hot coals, which are drawn from a fire with the hands, or hammering off the penis; another makes efforts to gouge out his eyes; hanging and strangulation are also attempted. These terrifying ideas are greatest at night; they are sleepless, and may refuse food under the idea that it is poisoned. They lose weight and look pale; pulse rapid and *irregular*, running up during a period of intense terror;

tongue coated; breath offensive. Rarely, there may be epileptic seizures; or the delirium may not be so active; but there is a decided delusion of persecution, with hallucinations of hearing; they hear persons calling them vile names and accusing them of crimes, using blasphemous phrases. They may develop delusions of marital infidelity; these delusions are almost characteristic of alcoholic insanity, and its subjects are dangerous individuals. In others there may be a hallucinatory stupor, with restlessness, which may entirely subside in a few days.

There may be a gradual mental enfeeblement, a dementia, with defective memory for recent events. There may be sensory disturbances in these cases, depending upon neuritis. (See Alcoholic Neuritis.)

In the more acute cases the prognosis is always favorable. If there is a gradual and steady mental enfeeblement, recovery is only partial; if the alcoholic excesses are continued, there is ultimately complete mental enfeeblement. There may be an apparent dementia from which they may recover partially or entirely.

Treatment.—Must be abstinence from alcohol. In the acute conditions it may be necessary to give morphin to quiet the terrifying hallucinations; chloral may have to be given to procure sleep. It may be necessary to give hyoscyamin or hyoscin; it should be given once and under the physician's direction, and not repeated without his seeing the patient again. As much food should be given as they can be induced to take. The secretions should be kept active.

CHAPTER V.

DEGENERATIVE PSYCHOSES.

HE degenerative psychoses are here understood as exam- of various types of mental breakdown leading to a mild profound state of dementia. Such are the result of a e variety of causes, but a number are of sufficiently definite course to warrant their special place in nosology. Thus in some traumatic neurasthenias dementia supervenes and a true *dementia traumatica* results. Following acute meningitis in the tuberculous there may result a *dementia meningitica. Alcoholic dementia* and *epileptic dementia* have been considered. Following cerebral hemorrhages, cerebral thrombosis, or embolism, dementia may result. In many young persons the developmental period of puberty proves disastrous and *dementia præcox* develops. Finally *dementia paralytica* or general paresis and *senile dementia* complete the survey of these simple degenerative psychoses.

Of these various forms of dementia, only two will here be considered—*dementia præcox* and *dementia paralytica.*

DEMENTIA PRAECOX.

"Stranded on the rock of puberty" is the characteristic phrase used by French writers in speaking of this interesting entity that has been recognized with reasonable definiteness among many of its allies only since 1888 by Clouston, A. Pick, 1891, and by Kahlbaum and by Kraepelin.[1]

Dementia præcox is a defect psychosis that develops during puberty or young manhood, and is characterized by a progressive deterioration in intelligence and by characteristic apathy and increasing stupidity.

Etiology.—Puberty, or the development of the sexual life, seems to play the most important rôle. It occurs as late as the twenty-fifth year, but is rare initially after that age. Men seem to be more often affected than women. Hereditary influences seem to play an important part in the history. Ziehen claims that 80 per cent. show some form of family history.

Symptoms.—Primary dementia, while manifesting many variations in its clinical history and progress, shows itself in about three main types (Kraepelin); secondary forms are numerous, but must be disregarded here. These are the *catatonic* form, the *hebephrenia* proper, and certain *paranoid* types.

---

[1] In the earliest period (1863–1871) it was termed hebephrenia (Kahlbaum and Hecker). In a second period the relation of the disease to puberty was brought more into the foreground, and it was considered as a degeneration. In 1893 Kraepelin first suggested the name of dementia præcox, and this author has elaborated his ideas more fully concerning its divers types.

In the earliest stages of this disease the patients give the characteristic picture of a developing neurasthenia. They become careless and forgetful, and appear less bright than when in a normal condition. Apprehension, dejection, suspicion may develop, and hallucinations, of hearing particularly, are characteristic. In this state the process closely resembles a melancholia. Delusions are frequent, often depressive, and in the paranoid forms they are persecutory in character.

There is a gradual clouding of consciousness. The association of ideas becomes less and less coherent; memory becomes gradually degenerated. It becomes difficult to awaken attention, and general apathy is apparent.

In the catatonic type, which is regarded by Kraepelin as a form of dementia præcox, there is a peculiar symptom-complex. There is intellectual stupor combined with peculiar automatic acts, muscular tension, verbigeration, echolalia. The patients are resistive, and there is gradual mental degeneration.

Most of these cases go on to dementia of a distinct grade. Some recover enough to be about and not constitute a drag upon their families—in the well-to-do. Some—even about 10 per cent.—are able to make a living in some restricted channel.

Treatment.—This is largely custodial, but something may be done by tonic treatment. Baths, electricity, light, open air, and sunshine on a ranch with an attendant may help some. Others are benefited by a long sea-voyage.

Bibliography.—Kraepelin, Ziehen, Lehrbuch. Deny and Roy, Le demence precoce, 1902.

GENERAL PARALYSIS OF THE INSANE (Progressive Paresis; Dementia Paralytica).

This is a chronic disease of the brain characterized by narked mental enfeeblement, with grandiose, hypochondriacal, r *melancholic* delirium.

Etiology.—This appears not to be definitely determined; it is very frequently seen in persons of neuropathic inheritance; excesses of all kinds—in alcoholic drink, venery, excessive mental strain, and anxieties in business, late hours, and over eating. The changes brought about by the syphilitic poison are undoubtedly the most frequent cause.

Symptoms.—As prodromal symptoms, found in many cases, are marked changes in the disposition and character; they become irritable and fault-finding, especially at home, quarrel with their wives and children without cause; neglect their work; make mistakes in their business; are careless; formerly of exemplary character, they now begin to drink freely, are overactive, but in a careless, disorderly manner, going from one subject to the other, without the least effort to accomplish anything they undertake; they may associate with fast women, upon whom they spend large sums of money. They complain of fulness and pain in the head, vertigo, and insomnia. After this prodromal stage the delirium may be extravagant, hypochondriacal, or melancholic; or there may be a passive, self-satisfied state. There may be a sudden or gradual development of grandiose ideas; they become very active, sanguine to the extreme about their business prospects, anticipate the making of large sums of money; talk incessantly of business enterprises, one after the other, and usually of immense extent, requiring for their development very large sums of money. The absurdity of these plans and the bringing in of collateral plans of the most ridiculous kind are evidence of their mental weakness; the weakened memory is marked by their forgetting the detail of their plan as first stated. Or they are suddenly plunged into a maniacal state, talking incessantly, passing from one extravagant statement to another without any connection; are in constant physical activity; there may be a decided mental confusion; they may tear and break things about them. Others are moderately quiet and happy in their ideas of wealth; if they are unrestrained, they spend large sums of money, buy horses and carriages, gloves, umbrellas in large numbers, or spend their money on useless trifles; or in their activity they may paint their houses inside with whitewash or in the most fantastic colors. They may pick up pieces of coal, wood, stones, and rubbish, say they are diamonds, gold, or valuable articles, and put them away carefully (Fig. 49).

The sexual desire is often much exaggerated at this period. They wander from one extravagant idea and act to another; their variety is innumerable. Instead of the ambitious delirium there may be hypochondriacal or melancholic ideas; they are depressed, say their teeth are lost, something is wrong with their eyes, arms, or mouth; complain of pain in various parts of the body; show what they take to be changes in their skin and hands; are very emotional; cry without cause. They are often conscious of their condition. There may also be a mild delirium of persecution; they think people are following or watching them. This delirium may continue until dementia is extreme, or it may be replaced by extravagant ideas, or there may be mild ambitious ideas associated with it. Another form is the delirium of satisfaction; the person feels perfectly well; never was better in his life; is satisfied and contented even with the plainest food and housing; is quiet, gives expression to no ideas or wants.

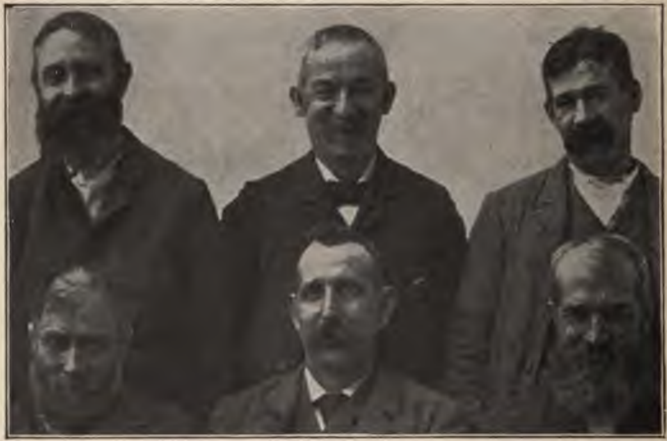

FIG. 49.—A group of paretics. Taken to show exalted and melancholic phase (Dr. Atwood).

The defect in memory increases; they lose themselves, forget the ordinary occurrences in their daily life.

The physical symptoms which often appear early are difficulty in speech—it is thick and hesitating; they are unable to pronounce words distinctly; this is much greater if the person is agitated or angry; the lips and facial muscles tremble. The pupils are contracted or irregular, or one is larger than the other; their reaction to light may be diminished or lost. There may occur at any time during the course of the disease epileptiform and apoplectiform seizures. The epileptiform attacks may begin with localized twitchings of the muscles of the face or one hand, and gradually extend into a generalized convulsion; with all the features of epilepsy—during which the temperature runs very high. There may be a series of these convulsions similar to those found in status epilepticus; during these attacks the person may die, or the convulsions may cease, leaving him very stupid, and perhaps paralyzed on one side. The stupor and paralysis usually pass away; the person is always worse after these attacks; it can be observed that he is weaker and more feeble mentally; it is possible to have a lasting hemiplegia in these cases. Apoplectiform seizures occur in which there are no convulsions; they suddenly become rigid, stupid, pass urine involuntarily; in a short time they recover, but are stupid and dull, with more or less marked hemiplegia, which gradually disappears. The tendon-reflex may be present, absent, or exaggerated.

As the disease progresses they become more and more feeble, mentally and physically. The urine may dribble away. They eat voraciously whatever is set before them; taste is evidently very much diminished; they are at this stage in danger of choking themselves by trying to swallow too large pieces of food. They may grow very stout or exceptionally thin and cadaveric. Trophic disorders appear. The bones may undergo changes similar to those found in locomotor ataxia. Ulcerations of the skin and paralytic edema are present. If they are not cut off by convulsions, the mental enfeeblement becomes extreme; physically, they become too feeble to move about, and are consequently confined to bed; diarrhea, extensive bed-sores, and ulcerations of the soft parts of the heel and toes occur, and they die of exhaustion or diarrhea.

At any time during the early course of the disease there may be an entire subsidence of the delirium and disappearance of the physical symptoms; the person is apparently recovered; he no longer expresses his extravagant ideas, behaves rationally, and returns to his business, which, if comparatively simple, he may perform without difficulty. This subsidence of the symptoms is known as a "remission"; it may last from a few months to one year, when the person again presents all the physical and mental symptoms as at the beginning, and the disease runs its course to death.

General paralysis occurs in women, but it is much less frequent; in most cases it occurs between thirty and forty-five years of age; it has evidently the same causes as in men. The marked delirium of extravagance is seen among women, but very much less frequently than in men, and their ideas are of diamonds, dresses, their personal appearance, or the number of their children; as a rule, the delirium is of a quieter kind: they are satisfied; occasionally they may express an extravagant idea, and it is then usually in regard to dress or personal appearance; a woman suddenly puts out her foot and asks if it is not a pretty foot, or she picks up the skirt of her dress and asks if her underskirt is not beautiful. They may have the hypochondriacal and melancholic ideas. The disease comes on and progresses more slowly than it does in men. They may have all the other symptoms.

Prognosis.—This is unfavorable; the duration varies: they may live two, three, or four years, exceptionally longer.

Pathologic Anatomy.—Marked thickening of the pia mater, with whitish streaks, especially along the vessels; the pia is adherent in places to the cortex; the vessels are tortuous and distended; the changes are most marked over the frontal lobes and the convolutions about the fissure of Rolando; there is more or less atrophy of the convolutions, with spots in which the atrophy is more extensive; here there may be found considerable edema of the pia mater. The occipital lobes are usually healthy. The ventricles may be distended with fluid; the ependyma is granular.

Histologically, the vessels are tortuous and enlarged. With aneurysmal dilatations, the nuclei in their walls are increased, especially at their bifurcations, with fatty and colloid degenerations of their walls. The perivascular spaces are distended and contain leukocytes and pigment-granules. There is marked evidence of hyperemia in the deep layers of the cortex and basal ganglia. The nerve-fibers have disappeared, and there is an increase in the neuroglia, with a profusion of spider-cells. The nerve-cells have undergone all degrees of fatty and pigmentary degeneration. Various grades of chromatolysis are constant. In the spinal cord there is more or less extensive change: sclerosis in the posterior columns; degeneration in the lateral columns, or more diffused lesions. This condition is often spoken of as chronic diffuse meningo-encephalitis, implying an inflammatory origin. Opinion differs on this point.

Treatment.—There is no treatment which cures this disease. The excitement is lessened by the use of ergot and bromid of sodium or potassium. In those cases where there is a clear history of syphilis, iodid of potassium in increasing doses, as is given in syphilitic nervous diseases, produces no effect whatever in this disease. Counterirritation of the scalp with tartar emetic ointment gives some temporary relief to the headache and fulness, but it is a very painful application. Very recently trephining has been tried, but it is not at all likely that it will be of much service, and the indications for its use are exceedingly vague. Quite a large proportion of these cases must be removed to asylums; others are quiet and are kept at home.

THE DEGENERATIVE INSANITIES WITHOUT INTELLECTUAL DEFECT.

The transmission of mental and physical peculiarities from ancestors to descendants is well known—the likeness to parents in face, actions, and bodily shape.

There may also be a transmission of abnormal states, mental and physical, or only a predisposition to their development under exciting causes. Hereditary transmission may *be direct, so that* the descendants present the same abnormal nervous manifestations, as in the transmission of hemicrania, epilepsy, or the same mental disorder. A parent suffering melancholia, a child may have the same, even the same morbid ideas; and these states may arise in the offspring at the same age they did in the ancestors. If both parents are neuropathic, the transmission is greater. If only one parent is neuropathic, the mother has a greater influence, as a rule, than the father. A suicidal tendency is often transmitted, so that many members of a family may commit suicide. This trait then becomes an evidence of neuropathic transmission; it is said that the influence of the father is most strong in this direction. Numerous instances of transmission can be easily found by any student or physician.

The transmissions are not always of the same disease; thus, insanity in a family, the descendants may suffer from chorea, epilepsy, or insanity, and these persons are more liable to have general paralysis of the insane than others. Alcoholic excesses in the parents are liable to predispose their descendants to cerebral and other nervous disorders.

In the simple transmission of a neuropathic constitution the power of the organism to resist disease is diminished, but there is no lesion. But the transmission may be associated with evidences of physical or mental degenerations, such as the physical and mental defects of idiots and imbeciles, obliquities in the mental state, imperative conceptions, fanciful ideas, etc. There may be an overdevelopment of one faculty (for mathematics or for music) and the marked enfeeblement of all the others; or there may be deformities of the head, face, mouth, body, hands, or feet, or in the great vessels of the body, etc., or constitutional anemia, which may play in these families an important part in the nutritional changes in the nervous system and other organs and perhaps explain the associations of phthisis, epilepsy, and insanity in the family and its branches.

PARANOIA.

The subjects of this condition inherit a neuropathic constitution; they often have from birth physical abnormalities—in the shape of the head or the body development; they are *oversensitive*, eccentric, and odd; they have strange ideas;

they are impelled to absurd acts by imperative conceptions; they are distrustful, given to excesses and to masturbation. They may go through life without presenting further mental obliquity. In others, at the approach of puberty or the climacteric, with their disturbing elements, they may develop mental disorder. Or upon excesses of all kinds, deprivation of food, anxieties, overwork, and loss of sleep, they may develop acute delirium, characterized by intense hallucinations. In those cases which develop at puberty it may be of the type of a mild melancholia or mania, with more or less stupor and confusion. They rarely pass into dementia. At a later period of life an active delirium, sensorial in character, with depressed or exalted ideas, may develop with delirium of persecution, and intense hallucinations of hearing of terrifying nature, from which they may recover more or less suddenly. There are great danger of relapses and the possibility later of the development of fixed delusions, hallucinations, and illusions.

The chronic form is the most marked, and it usually begins as depression, the result of some mental or physical strain. They become a prey to painful ideas, perplexities, and anxieties; sleep and appetite are lost; they have a vague suspicion that people about them do not wish them well—they desire to get them out of their occupations or to throw upon them the blame of their errors. As this strained condition of oversensitiveness increases they keep to themselves, avoid people, think people in the street are especially observing them; the frequent meeting of a person makes them suspicious of him; they are annoyed and offended by trivial remarks; they think the people passing cough or "suck their teeth" at them so as to annoy. They are the constant prey of painful ideas. They apply to themselves remarks they hear in casual conversation. This continues until at last they believe that they are the subject of conspiracy and persecution. They may gradually or suddenly develop hallucinations, hear voices threatening them, calling them vile names; the voices come from all directions, even from their own body. They appeal to the police for protection. May develop the idea that they are the victims of a conspiracy by Jesuits or Freemasons; or that electric and telephonic machines are in some way made to act upon them. *They may* have hallucinations of smell and taste; they are poisoned at night by obnoxious gases, and resort to all kinds of strange devices to obtain fresh air; or the food tastes of dead bodies, arsenic, and other poisons; their drink contains urine; they smell chloroform and stop up the keyholes in consequence. They frequently change their place of residence to avoid these persecutions. Women hear themselves called prostitutes and insulting propositions being made to them. They may talk freely or answer the physician's questions with suspicion; may remain in bed and refuse food. They may remain in this condition for months or years. There may be temporary amelioration in the activity of the delusions and hallucinations, with relapses. Change of residence often gives rise to these improvements, but soon these delusions are as strong as ever: they think their enemies have discovered them. The ideas may very soon become fixed and systematized.

They may have disturbances of cutaneous sensibility, think animals are in their bodies, that sexual liberties are taken with them at night, that their viscera are displaced or drawn up. They may have delusions of poisoning, when they refuse food, but will live on raw eggs or cook their own food. Hallucinations of vision are rare. The delusions here are like those in melancholia, but they differ in that the person seeks for an explanation of his distressed mental state in the external world or his surroundings, and concludes that he is the victim of a conspiracy; while in melancholia he finds in himself the explanation of his feelings; it is a punishment for his crimes and misdeeds. At first these patients endure their persecutions passively, but later they become defiant, threaten their supposed persecutors, appeal to the court and police for protection and redress; finding no help, they become aggressive, and are then exceedingly dangerous; they may, on the least suspicion, take the life of any one around them, or perform some brutal act, often with the idea of calling public attention to their persecutions, and thus obtain redress. They never murder secretly, but openly. They may pass into a state of physical weakness, or there may occur a change in the delirium. They think they notice they are observed, and are the special object of attention and respect by great personages—actors, actresses, statesmen, etc.—as they pass them by. The newspapers hint at their noble birth;

they are the son or daughter of a king; a large fortune awaits them; or they are very learned poets and writers, great inventors, have a wonderful theory, or they are the suitors of some person of distinction (Dougherty thought he was the suitor of Mary Anderson; when confined in an asylum, he shot an assistant physician, having included among his persecutors the officers of the institution); or they travel from a distant city to have an interview with a young lady of wealth they never saw. At this stage the whole attitude and manner show the exalted ideas. In others the ideas of grandeur are expressed in a feeble manner; they are queen of heaven, etc., the Messiah, Son of God (Fig. 50).

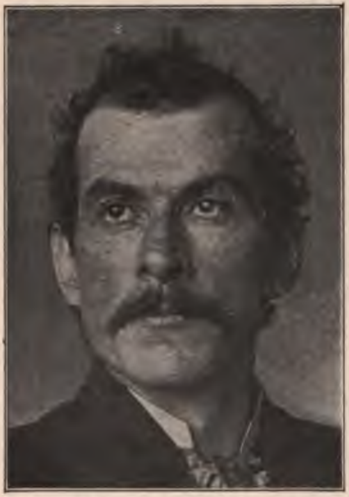

FIG. 50.—Erotic paranoia. "Mary Anderson's lover" (Peterson).

The delirium of grandeur developed explains to them the cause of their persecution; it was to deprive them of their inheritance or to prevent their marriage.

These chronic cases are incurable; they undergo a certain mental enfeeblement, but there is no tendency to dementia; when confined in an asylum, they live for years, continually discontented.

CHAPTER VI.

THE SIMPLE PSYCHOSES—MELANCHOLIA; MANIC—DEPRESSIVE INSANITY.

MELANCHOLIA.

THE characteristic of this disease is a profound mental disturbance, varying from simple depression to the most violent despair, with agitation or passive resignation. By the degree in which this depression presents itself we can recognize a simple, passive, agitated, and attonita variety.

The disease develops slowly and progressively as the result of disturbances of the physical and mental state. General disorders of nutrition, the result of gastro-intestinal affections, severe loss of blood, as after parturition, lactation, loss of sleep, painful neuralgias, and, more recently, la grippe, have been, by their depressing influences, causes of this disorder. If these causes act upon a nervous system predisposed to disease by reason of an inherited or acquired neuropathic state, the resistance is less great than in a healthy nervous organization.

It begins by a general mental depression, forebodings, discouragement, irritability. The patient loses interest in home and family and neglects his work; sleep is poor; appetite fails; women have attacks of crying and grow thin; the bowels are constipated, and the tongue may be coated. This condition may, in the mildest cases, end in simple melancholia. But often patients become restless and sleepless at night; they experience all sorts of uncomfortable sensations in the head; the feeling of depression increases; and they have all manner of forebodings and dread. They are unable to account for their condition. If their intellect is sufficiently disturbed, they connect the depression with the idea that they have done wrong, either by committing an unlawful act or neglecting the performance of some service to God or to their children; or some trivial act of their life is recalled which is judged by them to render them liable to punishment. These thoughts take complete possession of them; they think of nothing else. They walk from place to place, perhaps wringing the hands, and reveal constantly their morbid ideas; the facial expression is anxious and distressed (Fig. 51).

They neglect all their duties. Even eating and dressing are abandoned, and they go about with disordered clothing and hair. They may manifest delusions that they are to be carried to jail or punished in some way for the (supposed) wrongs they have committed. They look out of the windows anxiously—the least noise attracts them—to see if some one is not coming to carry them off to execution, to the jail, or to an asylum; or they imagine that there is a conspiracy to poison them; or they lament that some calamity is about to happen to their family or that their property is being taken away from them, etc. They can give no reason for these beliefs. This condition may develop itself; the delusions may become overpowering and the intellect be profoundly disturbed. They believe they may be shot; they see persons coming to injure them. Every one who approaches them is about to do them harm they think. They have illusions; see in the things about the room and outside the figures of men, hangmen, or *men with guns*, wild beasts (this is most decided toward the

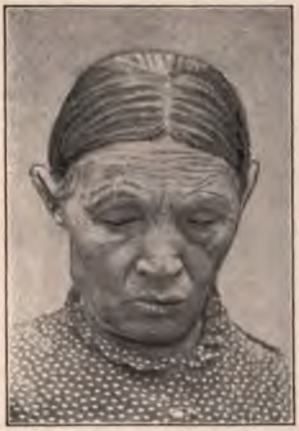

FIG. 51.—Acute melancholia passiva (Peterson).

evening, when everything is in shadow). They suspect some danger is concealed behind every nook and corner of the room, and every moment anticipate that some one will come in through the door. They have hallucinations of smell at times, and they think they smell blood and dead bodies.

They have hallucinations of hearing, such as the shrieks of persons being killed—their children perhaps; threats of torture; the applying to them of vile names, etc. In this terrified condition they will often rush about, try to get out of the windows and doors, call for help, and attack those about them, especially if, in their confusion, they believe they are about to be injured. Under these circumstances they pay no attention to their appearance, take no food or water, and do not attend to the calls of nature. Often the agitation is so great that it alone prevents them from taking food and drink. If they take water, they hastily swallow a few mouthfuls, looking about them in a suspicious, anxious manner, and then run away; or they may refuse food and drink as the result of delusions of poisoning or from hallucinations as to the smell of dead bodies, etc. This is the agitated melancholia. All these melancholics may attempt suicide, either to rid the world of their worthless selves or to avoid the persecutions and tortures which, they think, are about to be inflicted upon them.

In the passive form the reverse of these conditions is seen: patients are quiet, resigned, and remain in one place and one attitude for days, weeks, or months. The expression shows distress, but not terror, as in the agitated form. If they reply, it is in a low tone and indistinct. Visits of friends make no impression on them. They are annoyed by any effort to change their position, and they resist passively. In melancholia attonita consciousness is paralyzed in the highest degree; they are under the influence of painful impressions; they are stupid, remain in one position, and at night they do not sleep; they place themselves in the most uncomfortable positions; remain in a fixed attitude, with head bent on chest, arms flexed or crossed over the chest in a state of profound stupor; they are cold and cyanosed; there are marked nutritive and vascular disturbances; there may be a paralytic edema of feet and hands; pulse is feeble; secretions are diminished; they lose flesh. It is with difficulty that these patients are made to eat; they have to be dressed and undressed, put to bed, and they may make much resistance to these efforts to serve them.

A considerable proportion of these cases will recover, but the prognosis is not so favorable as in mania. Recovery takes place slowly, and there are often periods of exacerbation in the course of convalescence. The person laments less or his agitation is lessened. Then he begins to take a momentary notice of things about him, then more interest. In some cases it may be from three months to six or nine months before recovery takes place. If he does not recover, he passes either into chronic melancholia or into dementia more or less marked.

Treatment.—This must consist in the removal of any diseased condition of the viscera; relief of constipation; a liberal nutritious diet and wine. With a good deal of patience persons may be induced to eat sufficiently, and, in the milder cases even to take medicines, which should consist of tonics and small doses of opium or morphin, with a moderate amount of exercise out-of-doors—not enough to produce fatigue. If they remain sleepless, some hypnotic should be given at bedtime. A milk-punch or a glass of ale may sometimes give the desired sleep; or a small dose of camphor in oil, combined with tincture of lupulin, chloral, urethan, sulphonal, or paraldehyd may be used; the objection to the last is its disagreeable taste, which remains all the next day. In the more agitated cases there is much difficulty in feeding patients, and a stomach-tube may have to be resorted to before they will eat. They will take no medicines; hence small doses of morphin should be given unknown to them in coffee, or, if the agitation be very great, hypodermically.

MANIC–DEPRESSIVE INSANITY.

This is a term that is applied to a type of mental disorder which heretofore has been termed mania, circular insanity, and periodic insanity. It has so definite a history that it may be divided into three stages: the *maniacal*, the *depressive*, and the *mixed*.

The maniacal state is the reverse of the melancholic; there is an overactivity of all the mental functions: ideas flow with abnormal rapidity; persons conceive all kinds of projects in rapid succession; their physical activity corresponds to their mental exaltation; they are in constant motion; all the perceptions and the memory are keen; they recall readily past occurrences, plunge precipitately from one idea to another, and speak constantly. The facial expression is animated, but rapidly and frequently changes; they are irritable and suspicious; they cannot bear the least opposition or contradiction, and readily become angry and violent. They are the victims of their rapidly changing ideas and impulses. There is a feeling of personal importance. Men organize all sorts of business plans, give contradictory orders, or make plans for enjoyment without regard to expense. They go to excess in wine and women, smoke incessantly, and are in constant motion. Women make efforts to display their accomplishments in works, piano-playing, singing, etc. They are self-*satisfied; they feel themselves competent to the accomplishment of any project.* In mild cases the association of ideas

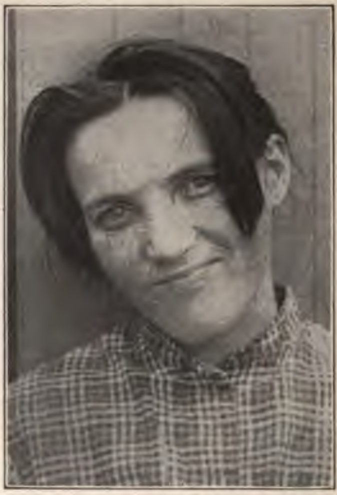

FIG. 52.—Mania (puerperal in origin) (Peterson).

may remain logical, but as they become more and more rapid, abundant, and disorderly, they become confused. The muscular movements also become wild and disorderly. Consciousness becomes clouded ; attention and perception are impossible. Illusions and hallucinations may occur, but they are not a part of the ordinary symptomatology, and they play no part in the delirium. They are now in constant motion and gesticulating ; they cry, laugh, and dance about ; lose all sense of decency. The exaggeration of personality may lead them to say they are kings, queens, great actors, musicians, or statesmen (Fig. 52).

All the sensations are exalted ; light and noise disturb them. They may remove their clothing to relieve themselves of excessive warmth. They appear to suffer no muscular fatigue. In simple cases there is no elevation of temperature ; the pulse varies—it may be full and rapid. If the paroxysm lasts long and they take little food and lose sleep, their weight diminishes rapidly.

The **prognosis** is very favorable in these simple cases. If recovery does not occur, it is followed by mental enfeeblement—dementia.

Treatment.—Allay the nervous irritability. They should be isolated ; they should be induced to take plenty of food, if that is possible. Bromid of sodium in full doses may be needed to quiet the excitement, and sleep should be procured at night by chloral and morphin or sulphonal ; a dose or two of hyoscyamin at intervals may be necessary. Cold baths may diminish the excitement. If they lose flesh and the pulse grows weak, wine should be given with the food. Tepid baths may also be found beneficial.

PERIODIC MANIA.

Periodic mania is the same disease with more tendency to recurrence. It is often preceded by a state of irritability, quarrelsomeness, and dissatisfaction, depression, disagreeable sensations. The patients may go to excess in drinking, etc., abuse their families and those about them ; the attacks may begin early in life or at the climacteric. In a more decided way they become quite violent, and break and destroy things about them. In a few days it may subside. The onset of these attacks is more apt to be sudden than in the simple mania and melancholia. Others may have religious ideas or think they have enemies about them, and suffer from hallucinations and more or less complete mental confusion; they have sudden attacks of destroying everything about them. They may express ambitious ideas—be haughty, but confused in their ideas; it is possible sometimes to gain their attention for a few seconds. The facial expression is animated; there is constant confused talking; in the absence of confusion they may accuse those about them of injustice and make complaints. They cannot remain quiet a moment, move from place to place, make all sorts of gestures, destroy things about them, pick the plaster away from the walls, tear up all their clothing until they are naked; may expose themselves with evident sexual excitement. Others make curious braids and ornaments with the pieces of torn clothing and bedding, which they tie around their head and waist; stick feathers or wisps of broom in their hair. They may use vile language; sing and shout night and day. The duration of these attacks varies from a few days to several weeks; it usually ceases gradually, with, at times, slight relapses for several days or weeks before the quiet interval is established. The time of interval between the attacks varies. Mentally they are not normal, often presenting a number of pathologic traits which they showed in an aggravated form during the maniacal seizure. Usually these attacks are exactly alike.

In the so-called **circular insanity** the two types are intermingled, apparently constituting different diseases, but in reality only one morbid process.

The mania is the mild mania of common type—a state of overactivity and excitation, mentally and physically. They are constantly occupied with some project or business scheme. They are egotistic, fault-finding, make complaints against the authorities or the officers of institutions; annoy and irritate those about them, then threaten them; move about constantly; if allowed to do so, engage in first one business, then in another, without any regard to their fitness for its prosecution, us to carry it on, or prospect of profit. They spend money *ssly, go to* excess in drinking, etc.; they have exalted ideas of their own importance, and not infrequently hypochondriacal ideas, but they are not expressed in a gloomy way. They think they have kidney or heart disease and wish to be examined; they write constantly long essays or letters, or they draw all kinds of figures and designs, which they show with satisfaction as remarkably well done—perhaps designs for mansions and stables they intend to erect. These are always curious and grotesque. Women are coquettish and try to make a display of accomplishments they do not possess. They talk and move about incessantly.

The depressive stage is of the type of common melancholia. The passive form is the most frequent. They become quiet, avoid people, keep the house, have a dread that something will happen to them. Hallucinations are rare, but they may have delusions that they are to be carried away; they speak less and less; the facial expression becomes apathetic and dull; if they speak, it is in a low tone; they remain in one position, with head and eyes down; they may refuse to eat, and have to be urged; they may go to bed on the appearance of this stage, and remain there during its continuance. They are apathetic, dull, and stupid; they cannot be induced to get up. During this stage they lose flesh if the refusal to eat is marked; the secretions are diminished, the bowels constipated, circulation impaired, hands and feet cold and blue, pulse small.

In the maniacal state this is just reversed: all the functions are active; they eat heartily, grow stout, and circulation and secretions are active.

The most common type is the depression followed by the mania; the passage from one state to the other may be sudden or gradual, without any interval; the duration of each phase of this cycle varies; it may be as short as a day, or it may last several months. Often the duration of each phase is alike—depression, six months; maniacal, six months; but it may be unlike. After the cycle has been run there may be an interval of apparent mental health; but it is more common to have that interval a shading off of one or other of the phases. As the condition becomes more pronounced they pass from one cycle to the other for the rest of their lives. The diagnosis rests in these cases upon the history *or observation of periodicity.*

CHAPTER VII.

DEMENTIA.

SENILE DEMENTIA.

THIS is the result of degenerative changes in the brain, atheroma, endarteritis, periarteritis, general disturbances in nutrition, localized atrophies, together with the changes in the other organs found in senility. It may begin at any time after fifty years of age. It begins usually with irritability, which is an expression of defective nutrition of the brain; dements become apathetic, suffer general malaise, with vertigo and insomnia. The memory becomes defective for recent events, while they can recall past events. As the condition progresses, they become obstinate, unreasonable, and often suspicious. They may think their house will be broken into by thieves; this makes them very anxious; they take extra precautions in fastening up the windows, and sometimes at an unusually early hour of the evening, or they may believe their goods are being carried away and that their families will starve. They become restless at night, get up and wander about at times looking for thieves; in other instances they can give no reason for their wanderings.

As the condition progresses they eat freely, forgetting soon afterward that they have had their meal, and calling for another; or they may go to alcoholic excesses in the same way, forgetting that they have taken a drink and take another. In spite of this consumption of food they grow thin and haggard, the face pale, and the skin wrinkled and shriveled. They lose all sense of propriety, make obscene and coarse remarks, expose their persons, or go about partly dressed, when they had in health been particular as to behavior and dress; or they may make foolish marriages or assaults upon girls. The general mental state in these persons is that of depression, but there may be exaltation to a moderate degree. As the disease progresses the defect in memory becomes great; they get lost in their wanderings, forget their house, and the names and number of their children. They may suffer apoplectiform seizures, grow more and more feeble; the disposition to wander away may become very troublesome; it is sometimes done with the idea that they are not in their own house; they may suffer from cystitis, and are liable to have pneumonia. They gradually fail, grow weaker mentally and physically, develop bed-sores, perhaps diarrhea, and die; often Cheyne-Stokes respiration appears at the last. Old people sometimes have attacks of ordinary insanity, such as melancholia, mania, etc.; then the mental changes are those found in those states, and are not included under senile dementia. The dementia after cerebral hemorrhage, tumor, and other gross brain disease is also not included under this head.

The duration of this condition varies very much: it may be rapid, especially if complications arise; otherwise it lasts from about one to three years.

Treatment can only be palliative. They have to be cared for like children. Some hypnotic may be given them at night, such as urethan, camphor, sulphonal, etc.

TERMINAL DEMENTIA.

This refers to the mental enfeeblement which is secondary to uncured acute attacks of mental disease. There may be so profound a mental enfeeblement that perception is completely abolished; the facial expression is blank, without a trace of animation even for a moment; they sit in one place all day, with the head down; only take food when it is taken to them or they to it; then they eat voraciously and carelessly whatever is put before them; they have to be dressed and undressed; they pass their urine and feces where they are, unless attended to, in the profoundest cases; they make no reply to questions—intelligence is too much impaired to comprehend. In this state of vegetative life they may grow fat. Others can reply "Yes" and "No" to questions, but there is a good deal of uncertainty as to which should be the answer. In others the state of mental impairment is not so great; they can remember fairly well some subjects, and they are able to perform simple acts which by habit they have learned and requiring no reflection and judgment. Their association of ideas is defective; all the sentiments are very much impaired or abolished. Others are restless, walk about constantly, and are annoyed if disturbed. Often this condition of dementia follows rapidly upon the uncured acute mental disturbance; in others it approaches slowly, being preceded by a state of mental confusion and incoherence. It is sometimes possible to learn the nature of the primary mental disorder from the fragmentary expression of delusions which had previously existed in full force; in others it is impossible to do so without a history.

CHAPTER VIII.

DEFECTIVE MENTAL DEVELOPMENT.

IMBECILITY AND IDIOCY.

An arrest of cerebral development, either *in utero* or after birth, and, in consequence, entire absence or enfeeblement of the mental processes.

These two names indicate degrees of mental weakness; it is greatest in the idiot; the extent of mental weakness varies very much.

Etiology.—Heredity plays an important and large part in its causation; consanguineous marriages; scrofula; anything which very materially affects the nutrition and general health of the mother may cause it; injuries, great anxiety, or fright may also be causes. Alcoholism in the ancestors is responsible for a large proportion of these defectives. It may be the result of some cerebral disease coming on in the first period of life or injuries at that age; falls may cause it by the injury done to the brain. (See Spastic Hemiplegia in Children.)

Symptoms.—Numerous classifications have been made of idiots and imbeciles. Ireland described the genetous form which is the result of intra-uterine disturbances; these children are defective when they are born; he thinks the enlarged glands, abscesses, skin eruptions, etc., from which they suffer point to scrofula as a cause. Two-thirds of them he says die of consumption; physically, they are feeble, with impaired circulation, low temperature, cold extremities, and defective sensibilities. Trophic disturbances are easily set up; *their* secretions are defective and abnormal, with unpleasant

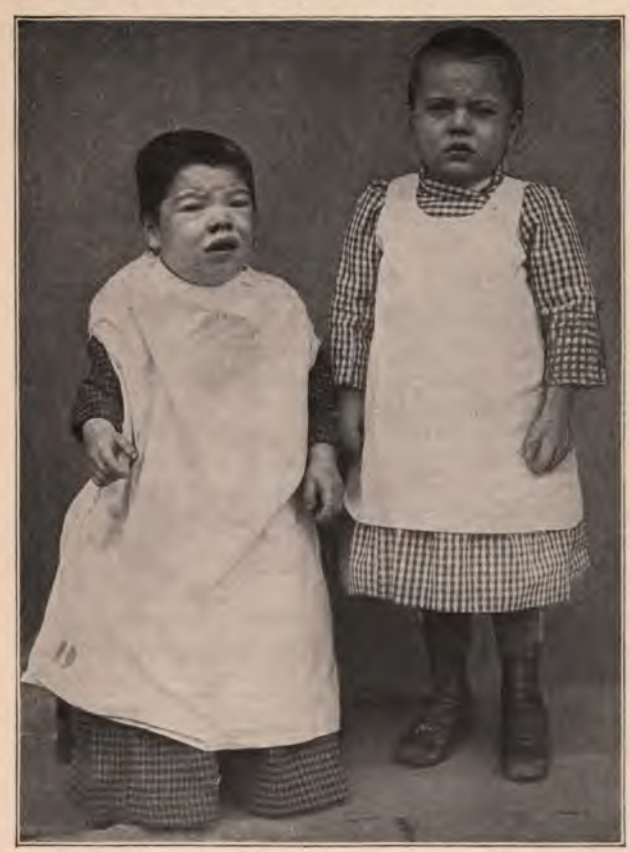

FIG. 53.—Cretin, aged thirteen years, standing beside normal brother, aged four years (showing dwarfing of growth) (Peterson).

odor; the heart is weak, with defective valves and often an open foramen ovale. They have the vaulted palate, the jaw protrudes, and the teeth project. They are dwarfish, and retain an infantile appearance; they are liable to deformities of the fingers and toes, coloboma, and hernia, and the testicles are occasionally wanting.

Cretinoid idiots are not common; they are short, with broad features, wide distance between the eyes, mouth large, thick lips kept open, hands and feet thick and broad.

Microcephalic idiots, in which there is lack of development of all the cerebrum or only portions of it, or parts may be entirely absent; the deficiency is generally in a diminution in the size of the hemispheres. The head is narrow and tapering toward the top, the nerves, basal ganglia, and spinal cord are usually better developed than the hemispheres. The cerebellum is relatively larger than in normal brains (Fig. 53).

The further divisions are eclampsic, epileptic, hydrocephalic, paralytic, traumatic, inflammatory, etc. It will be unnecessary to go into a detailed explanation of these varieties. In idiots there is scarcely any mental life; they eat and drink when it is given them, regardless of what it is; they neither speak nor have consciousness; they manifest such pleasure and pain as they are capable of by inarticulate sounds or screams, with disorderly movements; they are incapable of education. Some idiots may recognize persons they frequently see; they have no memory or idea of time. Their appearance is usually hideous; they eat ravenously what is set before them; they often drink the most disgusting and disagreeable tasting fluids; they do not appear to suffer pain as do normal individuals; they do not notice bruises and cuts, and often show no evidence of extreme changes of temperature.

Imbecility is a less profound arrest of the mental processes; it usually occurs as the result of some disease process—if not at birth, in the first three or four years of life, but it may also cur before birth as some defect in development. Imbeciles very much as to their behavior, facial expression, movets, etc., and their ability to learn. They are susceptible ore or less education. Those who suffer epilepsy as a plication are less favorable in this respect. The degree *ental activity* varies; many make great efforts to learn to walk and what is taught them. They often have great difficulty in learning numbers. If they are slow in learning to walk, they will be slow in learning to speak and in the acquiring of other knowledge. The ability to speak depends upon the range of ideas which the child is capable of. Some idiots never speak; they appear to be aphasic; they often show an aptitude for music.

These imbeciles and idiots may have, besides the epilepsy alluded to, paralysis, hemiplegic or paraplegic in type (see Spastic Hemiplegia in Children), as the result of atrophies of the brain. Disseminated sclerosis may be found, and various abnormalities of the cerebral conformation.

For further information on this subject consult Ireland, Idiocy and Imbecility; E. Seguin, Idiocy; the reports of Dr. Kerlin, Dr. Wilbur, etc.

Bibliography.—The following periodicals are devoted exclusively to the study of nervous and mental diseases:

British: Brain; Mind; Proceedings of the Society for Psychical Research; Journal of Mental Science.

American: Alienist and Neurologist; Journal of Insanity; Journal of Comparative Neurology; Journal of Nervous and Mental Disease; Journal of Psychology; Psychological Review; Quarterly Journal of Inebriety.

French: Archives Anthropologie Criminelle; Annales Médico-Psychologiques; Annales des Sciences Psychiques; Archives de Neurologie; Nouvelle Iconographie de la Salpêtrière; Revue Philosophique; Revue de Psychiatrie; Revue de l'Hypnotisme; Bulletin de l'Institut Psychique; Revue Neurologique.

Belgian.—Bulletin de la Société de Médecine Mentale de Belgique; Le Nevraxe.

German: Allgemeine Zeitschrift für Psychiatrie; Archiv für Psychiatrie und Nervenkrankheiten; Centralblatt für Nervenheilkunde; Der Irrenfreund; Jahrbücher für Pyschiatrie; Kraepelin's Psychologische Arbeiten; Monatsschrift für Psychiatrie und Neurologie; Neurologisches Centralblatt; Philosophische Studien; Neurologische Psychiatrische Wochenschrift; Zeitschrift für Psychologie; Deutsche Zeit*schrift für* Nervenheilkunde.

Italian: Annali di Freniatria; Annali di Nevrologia; Archivio di Psichiatria; Il Manicomio Moderno; La Psichiatria; Rivista di Patologia nervosa e mentale; Rivista Sperimentale di Freniatria; Rivista Neuropatologia Psichiatria; Rivista di Psicologia.

Russian: Archiv Psychiatrii, Nevrologuii, i Soudebnoi Psychopatologuii; Obozrenie Psychiatrii, Nevrologuii, i Experimentalnoi Psychologuii; Voprosi Nervno-psychitscheckoi Medizini; Voprosi philosophii i psychologuii.

Dutch, Nevrologische en Psychologische Bladen. *Japanese,* Nevrologia. *Norwegian,* Tidskrift, etc.

Practically all these journals are abstracted in the *Journal of Nervous and Mental Disease* of New York, which journal also presents a complete bibliography of American neurology and psychiatry.

There are two other important publications devoted to neurology: one bibliographic entirely, *Buschan's Bibliographischer Semesterbericht* and the *Jahresbericht über die Leistungen und Fortschritte aus dem Gebiet der Neurologie und Psychiatrie,* by Flatau, Mendel, and Jacobsohn; published by S. Karger, of Berlin.

INDEX.

ABSCESS of brain, 136
Acromegaly, 142
Acroparesthesias, 45
Agraphia, 122
Alcoholic insanity, 162
  paralysis, 53
Amyotrophic lateral sclerosis, 92
Analgesias, 45
Anesthesias, 45
Angular convolution, 121
Aphasia, 121
  associative, 122
  combined, 122
  intellectual, 121
  motor, 122
  sensory, 122
  true, 121
Apoplexy, 127
Apraxia, 122
Argyll-Robertson pupil in locomotor ataxia, 78
Arms and hands, painful condition of, 38
Ascending paralysis, acute, 72
Associative aphasia, 122
Ataxia, hereditary, 89
  locomotor, 78
    intestinal crises of, 80
Ataxic paraplegia, 88
Athetosis, 131
Atrophy, Erb's juvenile, 141
  facial, unilateral, 43
  muscular, spastic, 92
  progressive muscular, 74
      peroneal form, 77
  spastic muscular, 92
Aura, 30
  of hysteria, 153

BELL'S palsy, 57
Brachial plexus, paralysis from injury of, 62
Brain, abscess of, 136
  base, lesions of, 125
  diseases of, 115, 127
    localization, 115
      convulsive movements in, 115
      disturbances of hearing in, 120
      disturbances of smell in, 120
      disturbances of taste in, 120
      disturbances of touch in, 118
      disturbances of vision in, 118
      emotions in, 120
      paralysis in, 116

Brain, tumors of, 134
  vessels of, embolic closure, 129
    occlusion, 129
Broca's convolution, 121

CAUDATE nucleus, 123
Cephalalgia, 33
Cerebellum, lesion of, 125
  middle peduncles of, lesions of, 126
Cerebral cortex, localization in, 116
  hemorrhage, 127
  meninges, diseases of, 111
  sinuses, thrombosis of, 129
Cervicobrachial neuralgia, 46
Cervico-occipital neuralgia, 46
Charcot's disease, 92
Chorea, 26
  hereditary, 27
Circumflex nerve, paralysis of, 62
Coccygodynia, 45
Colic, lead, 55
Compression myelitis, 102
Conceptions, imperative, 155
Convolution, angular, 121
  Broca's, 121
  superior temporal, 121
Convulsive movements in localization of brain diseases, 115
Corpora quadrigemina, lesions of, 123
Cortex, cerebral, localization in, 116
ramp, writer's, 22
retin, 187
etinism, sporadic, 145
Crises, intestinal, of locomotor ataxia, 80

DEFECTIVE mental development, 186
Degenerative insanities without intellectual defect, 171
  psychoses, 164
Delirium, postepileptic, 160
Delusions, 149
Dementia, 184
  meningitica, 165
  paralytica, 165, 166
  præcox, 165
  senile, 165, 184
  terminal, 185
  traumatica, 165
Depressive insanity, 179
Diffuse scleroses, multiple, 108
Digiti mortui, 37
Diphtheric neuritis, 54
Duchenne-Erb paralysis, 62
Dystrophies, muscular, 139

EMBOLIC closure of vessels of brain, 129
Emotions in localization of brain diseases, 120, 121
Endarteritis, 129
Epilepsy, 30
  attacks of, 30, 31
  auræ of attacks, 30, 31
  Jacksonian, 30
  paralysis in, 31
  precursive, 31
  spinal, 103
  status epilepticus in, 31
Epileptic insanity, 139
Erb's juvenile atrophy, 141
Erythemomegalalgia, 38
Exophthalmic goiter, 40

Facial atrophy, unilateral, 43
  paralysis, peripheral, 57
  spasm, 25
    unilateral, 24
Feet, painful burning condition of, 37
Fibers, pressor, 36
Folie du toucher, 155, 157
Friedreich's disease, 89

Ganglia, basal, lesion of, 123
Gigantism, 142
Gilles de la Tourette, spasmodic tic of, 25
Glossy skin, 95
Goiter, exophthalmic, 40
Graves's disease, 40

Habit-spasms, 22
Hallucinations, 149
Hands and arms, painful condition of, 38
Headache, 33
  sick, 34
Hearing, disturbances of, in localization of brain diseases, 120
Hebephrenia, 165
Hemicrania, 34
Hemiplegia, spastic, in children, 130
Hemorrhage, cerebral, 127
Hereditary ataxia, 89
  chorea, 27
Hydrocephalus, chronic internal, 138
Hypophysis, lesions of, 125
Hysteria, 150
Hysterical insanity, 161

Idiocy and imbecility, 186
Illusions, 149
Imbecility and idiocy, 186
Imperative conceptions, 155
Infantile spinal paralysis, 68
Inflammation of spinal cord, 100
Insane, general paralysis of, 166
Insanities, 148
  degenerative, without intellectual defect, 171
Insanity, alcoholic, 162
  depressive, 179
  epileptic, 159
  hysterical, 161
  manic, 179
Intellectual aphasia, 121
Intestinal crises of locomotor ataxia, 80
Intoxication psychoses, 162
Iodothyrin, 146

Jacksonian epilepsy, 30

Landry's paralysis, 72
Language, zone of, 121
Lead colic, 55
  neuritis, 55
Leptomeningitis, 111
  infantum, 111
Lesions of basal ganglia, 123
  of brain base, 125
  of cerebellum, 125
  of corpora quadrigemina, 123
  of hypophysis, 125
  of middle peduncle of cerebellum, 126
  of pituitary body, 125
  of pons and medulla, 125
  of tegmentum, 123
Little's disease, 87

Localization of brain diseases, 115
  of lesions in spinal cord, 104
Locomotor ataxia, 78
    intestinal crises of, 80
Lumbago, 46
Lumbar plexus, paralysis of, 66
Lumbo-abdominal neuralgia, 46

MAIN en griffe, 77
Mania, periodic, 181
Manic insanity, 179
Median nerve, paralysis of, 60
Medulla and pons, lesion of, 125
  and spinal cord, diseases of, 67
Melancholia, 176
Meninges, diseases of, 111
Meningitis, 111
  acute, 111
  purulent, 112
  spinal, acute, 111
  tuberculous, 113
Mental development, defective, 186
Migraine, 34
Mimic tic, 25
Mind, diseases of, 148
Morton's tarsalgia, 46
Morvan's disease, 98
Motor aphasia, 122
  neuroses, 21
  nuclei, involvement of, 68
Multiple diffuse scleroses, 108
  neuritis, 52
Muscles, diseases of, 139
Muscular atrophy, progressive, 74
    peroneal form, 77
    spastic, 92
  dystrophies, 139
  pseudohypertrophy, 139
spasms, 22
Musculospiral nerve, paralysis of, 61
Myasthenias, 21
Myelitis, 100
  compression, 102
  of anterior horns of cord, 74
Mysophobia, 157
Myxedema, 144

NERVE tire, 17
Nervous system, peripheral, diseases of, 45
Neuralgia, cervicobrachial, 46
  cervico-occipital, 46
  lumbo-abdominal, 46
  paræsthetica, 46
  plantar, 46
  supra-orbital, 47
  trifacial, 46
Neurasthenia, 17
  traumatic, 21
Neurasthenias, occupation, 21
Neuritis, 51
  diphtheric, 54
  lead, 55
  multiple, 52
Neurons, peripheral sensory, 45
Neuropsychoses, general, 159
Neuroses, motor, 21
  vasomotor, 32
Nodding spasm, 25
Nucleus, caudate, 123

OBSTETRIC paralysis, 62
Occlusion of vessels of brain, 129
Occupation neurasthenias, 21
Oculomotor nerve, paralysis of, 56

PARALYSIS agitans, 28
  alcoholic, 53

Paralysis, ascending, acute, 72
  Bell's, 58
  Duchenne-Erb, 62
  facial, peripheral, 57
  general, of insane, 166
  in cerebral localization, 116
  infantile spinal, 68
  in hysteria, 152
  Landry's, 72
  obstetric, 62
  of brachial plexus, 62
  of circumflex nerve, 62
  of lumbar plexus, 66
  of median nerve, 60
  of musculospiral nerve, 61
  of oculomotor nerve, 56
  of peripheral motor nerves, 56
  of rectus nerve, external, 57
  of sacral plexus, 66
  of sixth nerve, 57
  of ulnar nerve, 60
  of vagus, laryngeal branches, 64
  peripheral facial, 57
  postepileptic, 31
  pseudohypertrophic, 139
  spastic spinal, 86
  spinal, acute, 71
    infantile, 68
    subacute, 71
  vasomotor spasm and, 36
Paralytic dementia, 165, 166
Paranoia, 172
Paraplegia, ataxic, 88
  spastic, 86
  tetanoid, 86
Paresis, progressive, 166
Paresthesias, 45
Periodic mania, 181
Peripheral facial paralysis, 57
Peripheral nervous system, diseases of, 45
  sensory neurons, 45
Pituitary body, lesions of, 125
Plantar neuralgia, 46
Poliomyelitis, 68
Pons and medulla, lesion of, 125
Postepileptic delirium, 160
Precursive epilepsy, 31
Pressor fibers, 36
Progressive paresis, 166
Pseudohypertrophic paralysis, 139
Pseudohypertrophy, muscular, 139
Psychoses, degenerative, 164
  intoxication, 162
  simple, 176
Purulent meningitis, 112

RAYNAUD'S disease, 38
Rectus nerve, paralysis of, 57
Romberg symptom, 79

SACRAL plexus, paralysis of, 66
Saltatory spasm, 25
Scleroses, combined, 88
  multiple diffuse, 108
Sclerosis, amyotrophic lateral, 92
  lateral, 86
  primary, of lateral columns, 86
Seguin, signal symptom of, 30
Senile dementia, 165, 184
Sensory aphasia, 122
  neurons, peripheral, 45
Sick headache, 34
Sinuses, cerebral, thrombosis of, 129
Sixth nerve, paralysis of, 57
Skin, glossy, 95
Smell, disturbances of, in cerebral localization, 120

Spasm, facial, 25
    unilateral, 24
  habit-, 22
  muscular, 22
  nodding, 25
  saltatory, 25
  spinal accessory, 23
  vasomotor, and paralysis, 36
Spasmodic tic, 25
Spastic hemiplegia in children, 130
  muscular atrophy, 92
  paraplegia, 86
  spinal paralysis, 86
Spinal accessory spasm, 23
  cord, diseases of, 67
    anterior horns and lateral tracts, lesion of, 92
    anterior horns, chronic myelitis of, 74
    anterolateral columns, diseases of, 86
    diseases of, diffuse, 100
    gray substance, lesions of, 94
    inflammation of, 100
    localization of functions of segments of, 107, 108
      of lesions in, 104
    posterior columns, disease of, 78
    posterolateral column, lesion of, 88
  epilepsy, 103
  meninges, diseases of, 111
  meningitis, acute, 111
  paralysis, acute, 71
    infantile, 68
    spastic, 86
    subacute, 71
Sporadic cretinism, 145
Status epilepticus, 31
Supra-orbital neuralgia, 47
Syringomyelia, 94

TABES dorsalis spasmodique, 86
Tarsalgia, 46
  Morton's, 46
Taste, disturbances of, in cerebral localization, 120
Tegmentum, lesion of, 123
Temporal convolution, 121
Terminal dementia, 185
Tetanoid paraplegia, 86
Tetany, 25
Thomsen's disease, 147
Thrombosis of cerebral sinuses, 129
Tic, mimic, 25
  spasmodic, 25
Tics, 22
Torticollis, 24
Touch, disturbances of, in cerebral localization, 118
Traumatic dementia, 165
  neurasthenia, 21
Trifacial neuralgia, 46
Tuberculous meningitis, 113
Tumors of brain, 134

ULNAR nerve, paralysis of, 60

VAGUS, laryngeal branches of, paralysis, 64
Vasomotor neuroses, 32
  spasm and paralysis, 36
Vermis, 126
Vision, disturbances of, in cerebral localization, 118

WRIST-DROP of lead neuritis, 55
Writer's cramp, 22
Wry-neck, 24

SAUNDERS' BOOKS

on

Skin, Genito-Urinary Diseases, Chemistry, and Eye, Ear, Nose, and Throat

W. B. SAUNDERS & COMPANY

925 Walnut Street **Philadelphia**

NEW YORK
Fuller Building, 5th Ave. and 23d St.

LONDON
9, Henrietta St., Covent Garden

MECHANICAL EXCELLENCE

NOT alone for their literary excellence have the Saunders publications become a standard on both sides of the Atlantic: their mechanical perfection is as universally commended as is their scientific superiority. The most painstaking attention is bestowed upon all the details that enter into the mechanical production of a book, and medical journals, both at home and abroad, in reviewing the Saunders publications, seldom fail to speak of this distinguishing feature. The attainment of this perfection is due to the fact that the firm has its own Art Department, in which photographs and drawings of a very high order of merit are produced. This department is of decided value to authors, in enabling them to procure the services of artists specially skilled in the various methods of illustrating medical publications.

***A Complete* Catalogue of our Publications will be Sent upon Reques**

Stelwagon's Diseases of the Skin

A Treatise on Diseases of the Skin. For Advanced Students and Practitioners. By HENRY W. STELWAGON, M. D., PH. D., Clinical Professor of Dermatology, Jefferson Medical College and Woman's Medical College, Philadelphia; Dermatologist to the Howard and to the Philadelphia Hospitals. Handsome octavo of 1115 pages, with 220 text-cuts and 26 full-page colored lithographic and half-tone plates. Cloth, $6.00 net; Sheep or Half Morocco, $7.00 net.

JUST ISSUED—THIRD REVISED EDITION

THREE LARGE EDITIONS IN LESS THAN TWO YEARS

The exhaustion of three large editions of this work in less than two years and the many complimentary review notices have been exceedingly gratifying. Such a kind reception permits the inference that the predominant aim kept in view in its preparation, of giving the general physician a treatise written on plain and practical lines, with abundant helpful case-illustrations, has been successful. In making the revision the author has taken the opportunity to incorporate the latest knowledge regarding the X-ray and high-frequency current treatment, as well as the advances in phototherapy. The text contains many original illustrations, besides a number of lithographs.

PERSONAL AND PRESS OPINIONS

John T. Bowen, M. D.,

Assistant Professor of Dermatology, Harvard University Medical School, Boston.

"It gives me great pleasure to endorse Dr. Stelwagon's book. The clearness of description is a marked feature. It is also very carefully compiled. It is one of the best text-books yet published."

Grover W. Wende, M.D.

Clinical Professor of Dermatology, University of Buffalo.

"I have recommended that the work be included in the catalogue of the University of Buffalo. I think you are to be congratulated on bringing out one of the very best works published in the English language."

Boston Medical and Surgical Journal

"We can cordially recommend Dr. Stelwagon's book to the profession as the best text- on *dermatology* for the advanced student and general practitioner that has been *strictly* up to date. . . . The photographic illustrations are numerous, and many are *of great* excellence."

DeSchweinitz's Diseases of the Eye

Recently Issued—Fourth Revised Edition, Enlarged

Diseases of the Eye: A HANDBOOK OF OPHTHALMIC PRACTICE. By G. E. DESCHWEINITZ, M. D., Professor of Ophthalmology in the University of Pennsylvania, Philadelphia, etc. Handsome octavo of 773 pages, 280 text-illustrations, and 6 chromo-lithographic plates. Cloth, $5.00 net; Sheep or Half Morocco, $6.00 net.

WITH 280 TEXT-ILLUSTRATIONS AND 6 COLORED PLATES

In this new edition the text has been thoroughly revised, and the entire work has been reset. Many new chapters have been added, such as Thomson's Lantern Test for Color-Blindness; Hysteric Alopecia of the Eyelids; Metastatic Gonorrheal Conjunctivitis; Grill-like Keratitis (Haab); the so-called Holes in the Macula; Divergence-paralysis; Convergence-paralysis, and many others. A large number of therapeutic agents comparatively recently introduced, particularly the newer silver salts, are given in connection with the diseases in which they are indicated. The illustrative feature of the work has been greatly enhanced in value by the addition of many new cuts and 6 full-page chromo-lithographic plates, all most accurately portraying the pathologic conditions which they represent.

PERSONAL AND PRESS OPINIONS

Samuel Theobald, M.D.,

Clinical Professor of Ophthalmology, Johns Hopkins University, Baltimore.

"It is a work that I have held in high esteem, and is one of the two or three books upon the eye which I have been in the habit of recommending to my students in the Johns Hopkins Medical School."

Late William Pepper, M. D.,

Professor of Theory and Practice of Medicine and Clinical Medicine, University of Pennsylvania.

"A work that will meet the requirements not only of the specialist, but also of the general practitioner in a rare degree. I am satisfied that unusual success awaits it."

British Medical Journal

"A clearly written, comprehensive manual. One which we can commend to stude as a reliable text-book, written with an evident knowledge of the wants of those ent *upon the* study of this special branch of medical science."

Barton and Wells' Medical Thesaurus

A Thesaurus of Medical Words and Phrases. By Wilfred M. Barton, A. M., M. D., Assistant to Professor of Materia Medica and Therapeutics, Georgetown University, Washington, D. C.; and Walter A. Wells, M. D., Demonstrator of Laryngology, Georgetown University, Washington, D. C. 12mo of 534 pages. Flexible leather, $2.50 net; thumb index, $3.00 net.

A UNIQUE WORK—JUST ISSUED

This work is unique in that it is the only Medical Thesaurus ever published. Instead of supplying the meaning to given words, as an ordinary dictionary does, it reverses the process, and when the meaning or idea is in the mind it endeavors to supply the fitting term or phrase to express that idea. This Thesaurus will be of service to all persons who are called upon to state or explain any subject in the technical language of medicine.

Boston Medical and Surgical Journal

"We can easily see the value of such a book, and can certainly recommend it to our readers."

Saxe's Urinalysis

Examination of the Urine. By G. A. De Santos Saxe, M. D., Pathologist to Columbus Hospital, New York. 12mo of 300 pages, illustrated. Flexible leather.

JUST ISSUED

This work is intended both for the student in the laboratory and for the busy practitioner in his office. The author describes many new methods devised during his own practical experience.

American Text-Book of Eye, Ear, Nose, and Throat

American Text-Book of Diseases of the Eye, Ear, Nose, and Throat. Edited by G. E. DE SCHWEINITZ, M. D., Professor of Ophthalmology in the University of Pennsylvania; and B. ALEXANDER RANDALL, M. D., Clinical Professor of Diseases of the Ear in the University of Pennsylvania. Imperial octavo, 1251 pages, with 766 illustrations, 59 of them in colors. Cloth, $7.00 net; Sheep or Half Morocco, $8.00 net.

This work is essentially a text-book on the one hand, and, on the other, a volume of reference to which the practitioner may turn and find a series of articles written by representative authorities on the subjects portrayed by them.

American Journal of the Medical Sciences

"The different articles are complete, forceful, and, if one may be permitted to use the term, 'snappy,' in decided contrast to some of the labored but not more learned descriptions which have appeared in the larger systems of ophthalmology."

Hyde and Montgomery's Syphilis & Venereal Diseases

Syphilis and the Venereal Diseases. By JAMES NEVINS HYDE, M. D., Professor of Skin, Genito-Urinary, and Venereal Diseases; and FRANK H. MONTGOMERY, M. D., Associate Professor of Skin, Genito-Urinary, and Venereal Diseases in Rush Medical College, in Affiliation with the University of Chicago. Octavo of 594 pages, profusely illustrated. Cloth, $4.00 net.

SECOND EDITION, REVISED AND GREATLY ENLARGED

In this edition every page has received careful revision; many subjects, notably that on Gonorrhea, have been practically rewritten, and much new material has been added. A number of new cuts have also been introduced.

American Journal of Cutaneous and Genito-Urinary Diseases

"It is a plain, practical, and up-to-date manual containing just the kind of information that physicians need to cope successfully with a troublesome class of diseases."

GET THE BEST

American Illustrated Dictionary

THE NEW STANDARD

Third Revised Edition—Just Issued

The American Illustrated Medical Dictionary. A new and complete dictionary of the terms used in Medicine, Surgery, Dentistry, Pharmacy, Chemistry, and kindred branches; with over 100 new and elaborate tables and many handsome illustrations. By W. A. NEWMAN DORLAND, M. D. Large octavo, nearly 800 pages. Full flexible leather, $4.50 net; with thumb index, $5.00 net.

THREE EDITIONS IN THREE YEARS—1500 NEW TERMS

In this edition the book has been subjected to a thorough revision. The author has also added upward of fifteen hundred important new terms that have appeared in medical literature during the past few months.

Howard A. Kelly, M.D.,
Professor of Gynecology, Johns Hopkins University, Baltimore.
"Dr. Dorland's Dictionary is admirable. It is so well gotten up and of such convenient size. No errors have been found in my use of it."

American Year-Book

Saunders' American Year-Book of Medicine and Surgery. A Yearly Digest of Scientific Progress and Authoritative Opinion in all Branches of Medicine and Surgery. Arranged, with critical editorial comments, by eminent American specialists, under the editorial charge of GEORGE M. GOULD, A. M., M. D. In two volumes; Vol. I.—*General Medicine*, octavo, 715 pages, illustrated; Vol. II.—*General Surgery*, octavo, 684 pages, illustrated. Per vol.: Cloth, $3.00 net; Half Morocco, $3.75 net.
old by Subscription.

e Lancet, London
"*It is much more than a mere compilation* of abstracts, for, as each section is entrusted *xperienced and able* contributors, the reader has the advantage of certain critical com-*taries and expositions* . . . proceeding from writers fully qualified to perform these tasks."

Gradle's
Nose, Pharynx, *and* Ear

Diseases of the Nose, Pharynx, and Ear. By HENRY GRADLE, M. D., Professor of Ophthalmology and Otology, Northwestern University Medical School, Chicago. Handsome octavo of 547 pages, illustrated, including two full-page plates in colors. Cloth, $3.50 net.

This volume presents diseases of the Nose, Pharynx, and Ear as the author has seen them during an experience of nearly twenty-five years. Topographic anatomy has also been accorded liberal space.

Pennsylvania Medical Journal

"This is the most practical volume on the nose, pharynx, and ear that has appeared recently. . . . It is exactly what the less experienced observer needs, as it avoids the confusion incident to a categorical statement of everybody's opinion."

Kyle's Nose *and* Throat

Diseases of the Nose and Throat. By D. BRADEN KYLE, M. D., Professor of Laryngology and Rhinology, Jefferson Medical College, Philadelphia; Consulting Laryngologist, Rhinologist, and Otologist, St. Agnes' Hospital. Octavo, 669 pages, over 175 illustrations, and 6 lithographic plates in colors. Cloth, $4.00 net.

JUST ISSUED—THIRD REVISED EDITION

This work has now reached its third edition. With the practical purpose of the book in mind, extended consideration has been given to treatment, each disease being considered in full, and definite courses being laid down to meet special conditions and symptoms.

Dudley S. Reynolds, M.D.,

Formerly Professor of Ophthalmology and Otology, Hospital College of Medicine, Louisville.

"*It is an important addition to the text-books now in use, and is better adapted to the uses of the student than any other work with which I am familiar. I shall be pleased commend Dr. Kyle's work as the best text-book.*"

Brühl, Politzer, *and* Smith's Otology

Atlas and Epitome of Otology. By GUSTAV BRÜHL, M. D., of Berlin, with the collaboration of PROFESSOR DR. A. POLITZER, of Vienna. Edited, with additions, by S. MACCUEN SMITH, M. D., Clinical Professor of Otology, Jefferson Medical College, Philadelphia. With 244 colored figures on 39 lithographic plates, 99 text-illustrations, and 292 pages of text. Cloth, $3.00 net. *In Saunders' Hand-Atlas Series.*

The work is both didactic and clinical in its teaching. A special feature is the very complete exposition of the minute anatomy of the ear, a working knowledge of which is so essential to an intelligent conception of the science of otology.

Clarence J. Blake, M.D.,

Professor of Otology in Harvard University Medical School, Boston.

"The most complete work of its kind as yet published, and one commending itself to both the student and the teacher in the character and scope of its illustrations."

Grünwald *and* Grayson's Diseases of the Larynx

Atlas and Epitome of Diseases of the Larynx. By DR. L. GRÜNWALD, of Munich. Edited, with additions, by CHARLES P. GRAYSON, M. D., Physician-in-Charge, Throat and Nose Department, Hospital of the University of Pennsylvania. With 107 colored figures on 44 plates, 25 text-illustrations, and 103 pages of text. Cloth, $2.50 net. *In Saunders' Hand-Atlas Series.*

In this work the author has given special attention to the clinical portion, the sections on diagnosis and treatment being particularly full. The plates portray, with a remarkable fidelity to nature, pathologic conditions that it would require a number of years to duplicate in practice.

British Medical Journal

"*Excels everything* we have hitherto seen in the way of colored illustrations of diseases of the larynx. . . . Not only valuable for the teaching of laryngology, it will prove *of the greatest help* to those who are perfecting themselves by private study."

Haab and DeSchweinitz's External Diseases *of the* Eye

Atlas and Epitome of External Diseases of the Eye. By Dr O. Haab, of Zürich. Edited, with additions, by G. E. deSchweinitz, M. D., Professor of Ophthalmology, University of Pennsylvania. 98 colored illustrations on 48 lithographic plates and 232 pages of text. Cloth, $3.00 net. *Saunders' Atlases.*

SECOND REVISED EDITION

The conditions attending diseases of the external eye, which are often so complicated, have probably never been more clearly and comprehensively expounded than in the forelying work.

The Medical Record, New York

"The work is excellently suited to the student of ophthalmology and to the practising physician. It cannot fail to attain a well-deserved popularity."

Haab and DeSchweinitz's Ophthalmoscopy

Atlas and Epitome of Ophthalmoscopy and Ophthalmoscopic Diagnosis. By Dr. O. Haab, of Zürich. *From the Third Revised and Enlarged German Edition.* Edited, with additions, by G. E. deSchweinitz, M. D., Professor of Ophthalmology, University of Pennsylvania. With 152 colored lithographic illustrations and 85 pages of text. Cloth, $3.00 net. *In Saunders' Hand-Atlas Series.*

In this work not only is the student made acquainted with carefully prepared ophthalmoscopic drawings done into well-executed lithographs of the most important fundus changes, but, in many instances, plates of the microscopic lesions are added. The whole furnishes a manual of the greatest possible service.

The Lancet, London

"*We recommend it* as a work that should be in the ophthalmic wards or in the library *of every hospital into* which ophthalmic cases are received."

American Text-Book of Genito-Urinary, Syphilis, and Skin

American Text-Book of Genito-Urinary Diseases, Syphilis, and Diseases of the Skin. Edited by L. Bolton Bangs, M. D., late Prof. of Genito-Urinary Surgery, University and Bellevue Hospital Medical College, New York; and W. A. Hardaway, M. D., Professor of Diseases of the Skin, Missouri Medical College. Imperial octavo, 1229 pages, with 300 engravings, 20 colored plates. Cloth, $7.00 net; Sheep or Half Morocco, $8.00 net.

This work gives a comprehensive and detailed presentation of the subjects discussed. The illustrations, many of which are in colors, portray the conditions with rare fidelity.

Journal of the American Medical Association

"This voluminous work is thoroughly up-to-date, and the chapters on genito-urinary diseases are especially valuable. The illustrations are fine and are mostly original. The section on dermatology is concise and in every way admirable."

Senn's Genito-Urinary Tuberculosis

Tuberculosis of the Genito-Urinary Organs, Male and Female. By N. Senn, M. D., Ph. D., LL.D., Professor of Surgery in Rush Medical College; Attending Surgeon to the Presbyterian Hospital, Chicago. Octavo volume of 317 pages, illustrated. Cloth, $3.00 net.

In the present work the bacteriology of the subject has received due attention, the modern resources employed in the differential diagnosis between 'ubercular and other inflammatory affections are fully described, and the med- al and surgical therapeutics are discussed in detail.

tish Medical Journal

The book will well repay perusal. It is the final word, as our knowledge stands, upon *iseases of which it treats,* and will add to the reputation of its distinguished author."

Mracek and Stelwagon's Diseases of the Skin

Atlas and Epitome of Diseases of the Skin. By Prof. Dr. Franz Mracek, of Vienna. Edited, with additions, by Henry W. Stelwagon, M. D., Clinical Professor of Dermatology, Jefferson Medical College, Philadelphia. With 63 colored plates, 39 half-tone illustrations, and 200 pages of text. Cloth, $3.50 net. *In Saunders' Hand-Atlas Series.*

In this volume the illustrations are all original and prepared from actual cases in Mracek's clinic, and the execution of the plates is superior to that of any, even the most expensive, dermatologic atlas hitherto published.

American Journal of the Medical Sciences

"The advantages which we see in this book and which recommend it to our minds are: First, its handiness; secondly, the plates, which are excellent as regards drawing, color, and the diagnostic points which they bring out."

Mracek and Bangs' Syphilis & Venereal Diseases

Atlas and Epitome of Syphilis and the Venereal Diseases. By Prof. Dr. Franz Mracek, of Vienna. Edited, with additions, by L. Bolton Bangs, M. D., late Prof. of Genito-Urinary Surgery, University and Bellevue Hospital Medical College, New York. With 71 colored plates and 122 pages of text. Cloth, $3.50 net. *In Saunders' Hand-Atlas Series.*

According to the unanimous opinion of numerous authorities, the illustrations in this work surpass in beauty anything of the kind that has been produced, not only in Germany, but throughout the literature of the world.

Robert L. Dickinson, M. D.,
Art Editor of "The American Text-Book of Obstetrics."

"The book that appeals instantly to me for the strikingly successful, valuable, and *graphic character* of its illustrations is the 'Atlas of Syphilis and the Venereal Diseases.' *I know of nothing* in this country that can compare with it."

Grant's
Face, Mouth, and Jaws

A Text-Book of the Surgical Principles and Surgical Diseases of the Face, Mouth, and Jaws. For Dental Students. By H. HORACE GRANT, A. M., M. D., Professor of Surgery and of Clinical Surgery, Hospital College of Medicine; Professor of Oral Surgery, Louisville College of Dentistry, Louisville. Octavo, 231 pages, with 68 illustrations. Cloth, $2.50 net.

This text-book, designed for the student of dentistry, succinctly explains the principles of dental surgery applicable to all operative procedures, and also discusses such surgical lesions as are likely to require diagnosis and perhaps treatment by the dentist.

Annals of Surgery

"The book is well illustrated, the text is clear, and on the whole it serves well for the purpose for which it is intended."

Grünwald and Newcomb's
Mouth, Pharynx, and Nose

Atlas and Epitome of Diseases of the Mouth, Pharynx, and Nose. By DR. L. GRÜNWALD, of Munich. *From the Second Revised and Enlarged German Edition.* Edited, with additions, by JAMES E. NEWCOMB, M. D., Instructor in Laryngology, Cornell University Medical School. With 102 illustrations on 42 colored lithographic plates, 41 text-cuts, and 219 pages of text. Cloth, $3.00 net. *In Saunders' Hand-Atlas Series.*

In designing this atlas the needs of both student and practitioner were kept constantly in mind, and as far as possible typical cases of the various diseases were selected. The illustrations are described in the text in exactly the same way as a practised examiner would demonstrate the objective findings to his class, the book thus serving as a substitute for actual clinical work. The illustrations themselves are numerous and exceedingly well executed.

American Medicine

"Its conciseness without sacrifice of clearness and thoroughness, as well as the excellence of text and illustrations, are commendable."

Jackson on the Eye

A Manual of the Diagnosis and Treatment of Diseases of the Eye. By EDWARD JACKSON, A. M., M. D., Emeritus Professor of Diseases of the Eye in the Philadelphia Polyclinic. 12mo volume of 535 pages, with 178 beautiful illustrations, mostly from drawings by the author. Cloth, $2.50 net.

In this book more attention is given to the conditions that must be met and dealt with early in ophthalmic practice than to the rarer diseases and more difficult operations that may come later. A special chapter is devoted to the relations of ocular symptoms and lesions to general diseases.

The Medical Record, New York

"It is truly an admirable work. . . . Written in a clear, concise manner, it bears evidence of the author's comprehensive grasp of the subject. The term 'multum in parvo' is an appropriate one to apply to this work. It will prove of value to all who are interested in this branch of medicine."

Friedrich *and* Curtis on Nose, Larynx, and Ear

Rhinology, Laryngology, and Otology, and Their Significance in General Medicine. By DR. E. P. FRIEDRICH, of Leipzig. Edited by H. HOLBROOK CURTIS, M. D., Consulting Surgeon to the New York Nose and Throat Hospital. Octavo volume of 350 pages. Cloth, $2.50 net.

In this work the author's object has been to point out the interdependence between disease of the entire organism and diseases of the nose, pharynx, larynx, and ear, and to incorporate the new discoveries of these specialties into the scheme of general medicine.

Boston Medical and Surgical Journal

"This task he has performed admirably, and has given both to the general practitioner and to the specialist a book for collateral reference which is modern, clear, and complete."

Ogden on the Urine

Clinical Examination of Urine and Urinary Diagnosis. A Clinical Guide for the Use of Practitioners and Students of Medicine and Surgery. By J. BERGEN OGDEN, M. D., Late Instructor in Chemistry, Harvard University Medical School; Formerly Assistant in Clinical Pathology, Boston City Hospital. Octavo, 418 pages, fully illustrated, including a number of colored plates. Cloth, $3.00 net.

SECOND REVISED EDITION—JUST ISSUED

In this edition important changes have been made in connection with the determination of Urea, Uric Acid, and Total Nitrogen; and the subjects of Cryoscopy and Beta-Oxybutyric Acid have been given a place. Special attention has been paid to diagnosis by the character of the urine and the diagnosis of diseases of the kidneys and urinary passages.

The Lancet, London

"We consider this manual to have been well compiled; and the author's own experience, so clearly stated, renders the volume a useful one both for study and reference."

Vecki's Sexual Impotence

The Pathology and Treatment of Sexual Impotence. By VICTOR G. VECKI, M. D. From the Second Revised and Enlarged German Edition. 12mo volume of 329 pages. Cloth, $2.00 net.

THIRD EDITION, REVISED AND ENLARGED

This volume will come to many as a revelation of the possibilities of therapeutics in this important field. The whole subject of sexual impotence and its treatment is discussed by the author in an exhaustive and thoroughly scientific manner. In this edition the book has been thoroughly revised, and new matter has been added, especially to the portion dealing with treatment.

***ohns Hopkins* Hospital Bulletin**

"*A scientific* treatise upon an important and much neglected subject. . . . The treatment *mpotence in general* and of sexual neurasthenia is discriminating and judicious."

American Pocket Dictionary **Just Issued, 4th Edition**

THE AMERICAN POCKET MEDICAL DICTIONARY. Edited by W. A. NEWMAN DORLAND, M. D., Assistant Obstetrician to the Hospital of the University of Pennsylvania. Containing the pronunciation and definition of the principal words used in medicine and kindred sciences. Flexible leather, with gold edges, $1.00 net; with thumb index, $1.25 net.

"I am struck at once with admiration at the compact size and attractive exterior. I can recommend it to our students without reserve."—JAMES W. HOLLAND, M. D., *Professor of Medical Chemistry and Toxicology, and Dean, Jefferson Medical College*, Philadelphia.

Stelwagon's Essentials of Skin **Fifth Edition, Revised**

ESSENTIALS OF DISEASES OF THE SKIN. By HENRY W. STELWAGON, M. D., PH. D., Clinical Professor of Dermatology in Jefferson Medical College and Women's Medical College, Philadelphia. Post-octavo of 276 pages, with 72 text-illustrations and 8 plates. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

"In line with our present knowledge of diseases of the skin. . . . Continues to maintain the high standard of excellence for which these question compends have been noted."—*The Medical News.*

Wolff's Medical Chemistry **Just Issued Sixth Edition, Revised**

ESSENTIALS OF MEDICAL CHEMISTRY, ORGANIC AND INORGANIC. Containing also Questions on Medical Physics, Chemical Physiology, Analytical Processes, Urinalysis, and Toxicology. By LAWRENCE WOLFF, M. D., Late Demonstrator of Chemistry, Jefferson Medical College. Revised by SMITH ELY JELLIFFE, M. D., PH. D., Professor of Phamacognosy, College of Pharmacy of the City of New York. Post-octavo of 222 pages. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

"The author's careful and well-studied selection of the necessary requirements of the student has enabled him to furnish a valuable aid to the student."—*New York Medical Journal.*

Martin's Minor Surgery, Bandaging, and the Venereal Diseases **Second Edition, Revised**

ESSENTIALS OF MINOR SURGERY, BANDAGING, AND VENEREAL DISEASES. By EDWARD MARTIN, A. M., M. D., Professor of Clinical Surgery, University of Pennsylvania, etc. Post-octavo, 166 pages, with 78 illustrations. Cloth, $1.00 net. *In Saunders' Question Compends.*

"The best condensation of the subjects of which it treats yet placed before the profession."—*The Medical News.*

Jelliffe *and* Jackson's Chemistry **Preparing**

A TEXT-BOOK OF CHEMISTRY. By SMITH ELY JELLIFFE, M. D., PH. D., Professor of Pharmacognosy, College of Pharmacy of the City of New York; and HOLMES C. JACKSON, M. D., Assistant in Chemistry, University and Bellevue Hospital Medical College, New York. Octavo, 550 pages, illustrated.

Wolf's Examination of Urine

A LABORATORY HANDBOOK OF PHYSIOLOGIC CHEMISTRY AND URINE-EXAMINATION. By CHARLES G. L. WOLF, M. D., Instructor in Physiologic Chemistry, Cornell University Medical College, New York 12mo volume of 204 pages, fully illustrated. Cloth, $1.25 net.

"The methods of examining the urine are very fully described, and there are at the end of the book some extensive tables drawn up to assist in urinary diagnosis."—*British Medical Journal.*

Jackson's Essentials of Eye **Third Revised Edition**

ESSENTIALS OF REFRACTION AND OF DISEASES OF THE EYE. By EDWARD JACKSON, A. M., M. D., Emeritus Professor of Diseases of the Eye, Philadelphia Polyclinic. Post-octavo of 261 pages, 82 illustrations. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

"The entire ground is covered, and the points that most need careful elucidation are made clear and easy."—*Johns Hopkins Hospital Bulletin.*

Gleason's Nose and Throat **Third Edition, Revised**

ESSENTIALS OF DISEASES OF THE NOSE AND THROAT. By E. B. GLEASON, S. B., M. D., Clinical Professor of Otology, Medico-Chirurgical College, Philadelphia, etc. Post-octavo, 241 pages, 112 illustrations. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

"The careful description which is given of the various procedures would be sufficient to enable most people of average intelligence and of slight anatomical knowledge to make a very good attempt at laryngoscopy."—*The Lancet,* London.

Gleason's Diseases of the Ear **Third Edition, Revised**

ESSENTIALS OF DISEASES OF THE EAR. By E. B. GLEASON, S. B., M. D., Clinical Professor of Otology, Medico-Chirurgical College, Philadelphia, etc. Post-octavo volume of 214 pages, with 114 illustrations. Cloth, $1.00 net. *In Saunders' Question-Compend Series.*

"We know of no other small work on ear diseases to compare with this, either in freshness of style or completeness of information."—*Bristol Medico-Chirurgical Journal.*

Wolff's Essentials of the Urine

ESSENTIALS OF EXAMINATION OF URINE, CHEMICAL AND MICROSCOPIC, FOR CLINICAL PURPOSES. By LAWRENCE WOLFF, M. D., Late Demonstrator of Chemistry, Jefferson Medical College, Philadelphia. Post-octavo, 66 pages, illustrated. Cloth, 75 cents net. *In Saunders' Question-Compend Series.*

Brockway's Medical Physics **Second Edition, Revised**

ESSENTIALS OF MEDICAL PHYSICS. By FRED. J. BROCKWAY, M. D., Late Assistant Demonstrator of Anatomy, College of Physicians and Surgeons, New York. Post-octavo, 330 pages; 155 fine illustrations. Cloth, *$1.00 net. In Saunders' Question-Compend Series.*

"*It contains all that one need know on the subject, is well written, and is copiously illustrated.*"—*Medical Record,* New York.

SAUNDERS' MEDICAL HAND-ATLASES

Atlas and Epitome of External Diseases of the Eye. By Dr. O. Haab, of Zurich. Edited, with additions, by G. E. de Schweinitz, M.D., Professor of Ophthalmology in the University of Pennsylvania. *Second Revised Edition.* With 98 colored illustrations on 48 plates and 232 pages of text. Cloth, $3.00 net.

"The work is well done, and is valuable to physicians in general, as well as to ophthalmologists. I shall take pleasure in recommending it."—John E. Weeks, M.D., *Clinical Professor of Ophthalmology, University of Bellevue Hospital Medical School*, N. Y

Atlas and Epitome of Internal Medicine and Clinical Diagnosis. By Dr. Chr. Jakob, of Erlangen. Edited, with additions, by Augustus A. Eshner, M.D., Professor of Clinical Medicine in the Philadelphia Polyclinic. With 179 colored figures on 68 plates and 259 pages of text. Cloth, $3.00 net.

"Dr. Jakob's work deserves nothing but praise. The information is accurate and up to present-day requirements."—*British Medical Journal.*

Atlas of Legal Medicine. By Dr. E. von Hofmann, of Vienna. Edited, with additions, by Frederick Peterson, M.D., Professor of Psychiatry, College of Physicians and Surgeons, New York. With 120 colored figures on 56 plates and 193 half-tone illustrations. Cloth, $3.50 net.

"It is rare indeed that so large a series of illustrations are found which demonstrate so well and so accurately the conditions which they are supposed to represent."—*Boston Medical and Surgical Journal*

Atlas and Epitome of Diseases of the Larynx. By Dr. L. Grunwald, of Munich. Edited, with additions, by Charles P. Grayson, M.D., Physician-in-Charge, Throat and Nose Department, Hospital of the University of Pennsylvania. With 107 colored figures on 44 plates, 25 text-illustrations, and 103 pages of text. Cloth, $2.50 net.

"Excels everything we have hitherto seen in the way of colored illustrations of diseases of the larynx."—*British Medical Journal.*

Atlas and Epitome of Operative Surgery. By Dr. O. Zuckerkandl, of Vienna. *From the Second Revised and Enlarged German Edition.* Edited, with additions, by J. Chalmers DaCosta, M.D., Professor of the Principles of Surgery and of Clinical Surgery, Jefferson Medical College, Philadelphia. *Second Edition, Revised and Greatly Enlarged.* With 40 colored plates, 278 text-cuts, and 410 pages of text. Cloth, $3.50 net.

"It may be said that few, if any, books of this description are so comprehensive in their scope."—*Philadelphia Medical Journal.*

Atlas and Epitome of Syphilis and the Venereal Diseases. By Prof. Dr. Franz Mracek, of Vienna. Edited, with additions, by L. Bolton Bangs, M.D., late Professor of Genito-Urinary Surgery, University and Bellevue Hospital Medical College, New York. With 71 colored plates and 122 pages of text. Cloth, $3.50 net.

"A glance through the book is almost like actual attendance upon a famous clinic."—*Journal of the American Medical Association.*

Atlas and Epitome of Skin Diseases. By Prof. Dr. Franz Mracek, of Vienna. Edited, with additions, by Henry W. Stelwagon, M.D., Clinical Professor of Dermatology, Jefferson Medical College, Philadelphia. With 63 colored plates, 39 half-tone illustrations, and 200 pages of text. Cloth, $3.50 net.

"The illustrations are very well executed, and the coloring remarkably accurate; they will serve as substitutes for clinical observation."—*Medical Record*, New York.

Atlas of Bacteriology and Text-Book of Special Bacteriologic Diagnosis. By Prof. Dr. K. B. Lehmann and Dr. *R. O. Neumann*, of Würzburg. *From the Second Revised and Enlarged German Edition.* Edited, with additions, by G. H. Weaver, M.D., Assistant Professor of Pathology and Bacteriology, Rush Medical College.

ERS' MEDICAL HAND-ATLASES

pitome of Special Pathologic Histology.—
URCK, of Munich. Edited, with additions, by LUDVIG HEK-
Professor of Pathology, Rush Medical College, Chicago. In
art I.—Circulatory, Respiratory, and Gastro-int al Tracts.
n, Skin,
and 350
3.50 net.
most beau
are of the
, London.
dents.
ith addi-
Luke's
143 text-
.00 net.
out to the
Medical
HAFFER,
Edition.
cturer on
With 207
pages of
.50 net.
valuable
bstet-
Revised
, Profes-
School.
.00 net.
clinical
and
Second
by J. C.
Cornell
lates, 38
.00 net.
scientific
nd Its
rom the
dditions,
System,
plates;
50 net.
A
At

LANE MEDICAL LIBRARY

To avoid fine, this book should be returned on or before the date last stamped below.

Nov. 26, 1917

MAY 19 '23

AR 23 '27

Medicine. as found in normal and pathologic condi

as and Epitome of Ophthalmoscopy and
noscopic Diagnosis. By DR. O. HAAB, of Zur
Third Revised and Enlarged German Edition. Edited,
y G. E. DE SCHWEINITZ, M.D., Professor of Ophthalmolog
ersity of Pennsylvania. With 152 colored figures; 82 pag

SAUNDERS' MEDICAL HAND-ATLASES

Atlas and Epitome of Otology. By G. BRUHL, M.D., of Berlin, with the collaboration of PROF. DR. A. POLITZER, of Vienna. Edited, with additions, by S. MACCUEN SMITH, M.D., Clinical Professor of Otology, Jefferson Medical College, Philadelphia. 244 colored figures on 39 lithographic plates, 99 text-cuts, and 292 pages of text. Cloth, $3.00 net.

"The most complete of its kind as yet published."—CLARENCE J. BLAKE, M.D., *Professor of Otology,*

Atlas and Epit
CENT DR. GEORG
LIAM B. COLEY,
sity, N. Y. 119

"For the general
ence. The book's
Medical and Surgi

Atlas and Epi
cations. By
additions, by Jo
Hopkins Univer
graphic plates,
"The author has
feature of the work
Bulletin.

Atlas and Epit
and Nose.
Revised and
JAMES E. NEW
University Medi
plates, 41 text-c

"A distinct and va
fields..'—*America*

Atlas and Ep
scopic Ana
with additions,
Embryology,
figures on 80 pl

"The 200 or mor
see them under t

Atlas and Ep
SCHAFFER, of
STKR, M. D. (
cology. Rush
Chicago. Wit
figures, many i

Atlas and E
By PR. DR. H
LUDVIG HEKT
in affiliation w
77 lithographic plates,
pages of text. *Read*

L356 Shaw, J.C. 16548
S53 Essentials of nervous
1904 diseases and insanity.
4th ed.

DATE DUE

E. Beebe jr, Nov. 27, '17
M. H. Lippman MAY 19 '23 MAY 1923
Fresno Co. Free Library MAR 25 24